

VATLY NEWSLETTER

Xin được nói thẳng
Hoang Tuy

CONTENT

This thirtieth issue of the **VATLY NEWSLETTER** opens with the traditional **NEWS FROM THE LABORATORY**. Our friend Hoang Tuy passed away on July 14th, Pierre says a few words reminding us of him and copies an article that he had written for a book published in his honour a few weeks before his death, **HOANG TUY, MY OLDER FRIEND**. Then Diep summarizes **OUR PRESENCE IN ASIA**, reviewing the activities and organizations in which we take part and the various events that we attend. Next, we copy the executive summary of a document entitled **A PLEA FOR THE INCLUSION OF BASIC RESEARCH IN A & A IN THE 2020-2030 NATIONAL S & T PROGRAMME** that we produced in response to an invitation of the head of VNCS to help with the update of the Space Plan for Vietnam. Thao reports about the present state of **THE HOA LAC TELESCOPE** and its potential as a training tool for master students. We next report about **OUR WORK ON AGB STAR R DOR** and on difficulties that we have met in publishing part of the results. Nhung reviews **OUR PARTICIPATION IN USTH** and comments on how we should like to see it evolve. Tuan Anh spent **TWO WEEKS IN HAWAII** with the James Clerk Maxwell Telescope, one of which taking shifts on top of Maunakea: he tells us about this exciting experience. Finally, Hoai and Diep report on **AN INTERVIEW OF DAM THANH SON** who kindly took the time to visit us on his way back to the States from a conference in Quy Nhon.

NEWS FROM THE LABORATORY

The past semester has seen the completion and publication of a number of papers, making 2019 even more productive a year as was 2018.

Thao has completed a paper on the Hoa Lac Telescope that she submitted to the Vietnamese Journal of Science, Technology and Engineering (VJSTE), she reports about it later in the issue. A detailed study of the protoplanetary disk of HD 163296, which displays a clear ring structure, was published in the same journal with Diep as first author; like much of our work, it uses archival ALMA observations; the project is funded by NAFOSTED with the request that at least one publication appear in a Vietnamese journal. In the context of her PhD thesis, Phuong submitted part of her work on the protoplanetary system GG Tau A for publication in A&A; she is first on the author list together with a few of us and collaborators from the Bordeaux, or Bordeaux-related, side. The paper that Ngoc and Diep had co-authored with a young colleague of Ngoc in LESIA (Paris-Meudon) is now accepted for publication in RAA; it studies the mapping of the Borealis Quadrangle of Mercury using MESSENGER data and was first submitted to Com. Phys. Vietnam; however, the editors proved unable to find proper referees and the Editor in chief, whom we asked for help, failed to give proper support: we decided to publish instead in RAA, one of the most prestigious Asian journals in astronomy and astrophysics, which is a pity for Com. Phys. Vietnam. In the wake of our work on AGB star EP Aqr, about which we abundantly reported in earlier letters, we studied R Dor, a star having very similar properties; a first paper on the wind at large distances, giving evidence for an episode of enhanced mass loss that occurred a century or so ago, has been accepted for publication in MNRAS; however a second paper, focussing on the observation of high velocity gas streams, has met important difficulties in the process of being reviewed, we talk about it later in the issue.

Another important piece of work, to which Hoai, Tuan Anh and Nhung have contributed, has been the production of a proposal to observe RS Cnc with NOEMA, the IRAM interferometer on Plateau de Bure in the French Alps. Thibaut Le Bertre and Jan Martin are the Principal Investigators and have been driving the redaction of the proposal. Another participant is Ka Tat Wong, a young postdoc from Hong Kong who is now working in Grenoble at IRAM and who made his PhD in Bonn with Karl Menten on high resolution observations of AGB stars, in particular of the circumstellar envelope of Mira Ceti. Preliminary observations have been made in the context of a Science Verification campaign of the new correlator (Polyfix) of NOEMA and Hoai contributed to their analysis and discussed them with Thibaut, Jan Martin and Ka Tat on the occasion of her recent visit to Paris. RS Cnc, as EP Aqr and R Dor, is an oxygen-rich AGB star: we hope that the new observations will contribute useful information to the solution of the puzzle posed by the high Doppler velocity spectral wings that our studies of EP Aqr and R Dor have revealed.

Diep, Nhung and Tuan Anh have been giving lectures at USTH and we welcomed three interns from the Space and Applications Department of the university for two summer months: Ha working with Thao on the telescope paper and Judith and Morteza working with Nhung and Hoai on a simulation of polar gas streams from AGB stars; Nhung reports about it later in the issue and comments on our discussions with Yannick Giraud-Héraud and Ngo Duc Thanh, who are responsible for the management of the Space and Applications Department of the university, aimed at obtaining more support and better recognition of our contribution.

It has now become a tradition for us, and particularly Diep, Loc and Thao, to help the team representing Vietnam at the International Olympiads of Astronomy and Astrophysics with their preparation for the event. This year was particularly successful as, in addition to the medals earned by the team, we were proud to see a young Vietnamese student in his second year of high school (grade 11) be awarded the “Absolute Winner Prize”. In order to continue the tradition in

future years a memorandum of understanding was signed in early June between VNSC and Hanoi-Amsterdam High School.

Another fruitful interaction with our Directorate occurred in March-April in relation with updating the national Space Plan meant to cover the 2020-2030 decade. The VNSC Director, Pham Anh Tuan, accepted to support our request to include in the plan a paragraph covering the need to support research in astronomy and astrophysics. We report about it later in the issue.



Loc with the IOAA team

On July 26th, Diep attended a workshop on “Guidance on NAFOSTED grants programme and sharing experiences on publishing in international journals.” NAFOSTED is the funding agency that supports most of our projects (VAST supports the rest). Five years ago, Pierre had been asked to write a testimony of our experience with NAFOSTED and had praised it highly, starting his report with “*The first and main statement I wish to make is that the existence of NAFOSTED is an essential asset to fundamental research in the country and is extremely beneficial to its success. It provides an objective assessment of the research projects that are submitted to it. With time, it should become the main tool in shaping a national scientific policy for fundamental research.*” Sadly, the Ministry of Finance proposed recently to progressively reduce the contribution of the state budget to NAFOSTED under the mask of increasing its autonomy. If such a proposal were enforced, it would have disastrous consequences for the development of basic research in Vietnam. This prompted Pierre to write an article in Tia Sang

taking the defense of NAFOSTED and concluding that “*What it needs is encouragement and support, not having its budget cut by some irresponsible financier under the pretext of increasing its autonomy. Basic research counts for a drop in the ocean of the national budget. To save money efficiently, we rather need to address the places where it is wasted on a large scale. For example by having no one in charge of major projects such as the Nuclear Power programme or the Space programme; or by investing in equipment that is not properly used and/or for which the maintenance and operation budget is inexistent; or by lacking sufficient energy and determination to fight corruption*”.

Websites are like scientific instruments: their owners must feel responsible for their maintenance, which is too often neglected. Ours needed some updating and refurbishing, which Hoai is doing. She is nearly through with the job and you may access the site at <https://www.vnsc.org.vn/dap>.



From left to right: Diep, Paul, Thuan and Pierre in our office

In September we had the honour and pleasure to welcome among us Paul Ho, DG of the East Asia Observatory (EAO). Paul understands very well the difficulties that we are meeting to promote astrophysics in Vietnam and is a friend of our team, supporting us both morally and materially and giving us wise advice. Diep reports about his visit and comments on our presence in Asia later in the issue. With EAO support, Tuan Anh spent two weeks in Hawaii with the James Clerk Maxwell Telescope (JCMT) and tells us about this experience later in the issue.

In the wake of his visit to EAO, Tuan Anh joined Mark Rawlings, from the JCMT staff, to lecture at the Tay Nguyen University in Buon Me Thuot. Together with two other astronomers (one from Japan, the other from South Korea) they introduced the basics of radio and optical astronomy to students attending the so-called EPAR school (Exploration Program in Astrophysics Research). The story behind this is an effort of our friend Le Minh Tan, whom we first met long ago in relation with the work that we had been doing using our 2.6 m radio telescope, to foster teaching and research in astronomy and astrophysics in his university. In particular, with the help of Nguyen Luong Quang who initiated the idea, they may be offered a 40 cm optical telescope from Japan. Mark Rawlings stopped by Hanoi on his way back to Hawaii and gave two seminars, one at USTH and one at VNSC, covering in particular the remarkable achievement of the Event Horizon Telescope in mapping a supermassive black hole. The event has been reported in a press release and a mini-workshop on “*Black holes and neutron stars, imagination and reality*” was organised on this occasion by our IOP friends.



Mark Rawlings giving the seminar on imaging a black hole in the VNSC auditorium

Our participation to conferences, workshops and schools in Asia is commented upon by Diep later in the issue. In particular, Tuan Anh, Thai and Phuong attended a workshop held in Bangkok in July on Big Data, Thao and Loc attended the NARIT International Training Workshop in May in Thailand, Ngoc attended the 7th School of Astrophysics in Quy Nhon in August

and she will attend ISYA 2019, the International School for Young Astronomers during the second half of October in Kunming (China). Thao and Dung will attend a workshop on Teaching Astronomy and Astrophysics, to be held in Malaysia in December and the 2019 SEAN (South East Asia Astronomy Network) will be held in Singapore at the end of December; Diep and Hoai will take part.

In Vietnam proper, we all attended the Hanoi Astrobiology Training School in April at the Institute of Physics on the VAST site; it had been organised by Dinh Van Trung with support from the International Centre for Physics, a virtual laboratory sponsored by UNESCO of which he is director, and which supports occasional students with a fellowship. Tuan Anh repeated his lecture on Astrophysics in Vietnam at the conference on *Elastic and Diffractive Scattering* that took place at the end of June in Quy Nhon, in the framework of the XVth Rencontres du Vietnam. He also contributed to outreach by giving several conferences in Vietnamese for the general public on the occasions of the USTH Space Day and of the National STEM (Science, Technology, Engineering and Mathematics) day.



Tuan Anh giving a public talk on the national STEM day

We had the pleasure of welcoming several visitors, with whom we often shared a lunch or who gave us seminars: Charles Bolden, former DG of NASA, Eddy Soewono from Bandung (Indonesia), our old friends Alain Maestrini and Patrick Aurenche and a young journalist, Louis Raymond, whom Pierre had invited after having read a particularly pertinent article of him about today's Vietnam.

Hoai spent the month of May in France, of which the first week was at IRAM in Grenoble with Jan Martin Winters; then they both went to Paris to work and discuss with Thibaut Le Bertre and Pierre Lesaffre, in particular on the preparation of the RS Cnc proposal. She spent the a few days in Bordeaux with Anne Dutrey and Stéphane Guilloteau. At that time, Diep happened to be also in Bordeaux to work with Anne on Phuong's PhD thesis, which they co-supervise.



At Anne's place: Phuong, Emilie, Anne, Stéphane and Hoai

Diep was financially supported by the French Embassy and Hoai by the Observatoire de Paris under a programme for visiting researchers covered by funds freed by the temporary absence of staff members on leave. This programme will be extended into next year and Tuan Anh will apply to join it, which would give him an opportunity to spend a month in France in 2020 and possibly work on the RS Cnc data if the proposal has been approved.

Phuong's thesis is now printed and the defence will take place in Hanoi in November. Jury members are Nguyen Mau Chung and Dinh Van Trung on the Vietnamese side, Emmanuel Dartois, Edwige Chapillon and Hideko Nomura on the French side; Dao Tien Khoa and Maryvonne Gerin, an astrochemist, share the chair. Next year Phuong will spend one month in Bordeaux working on new CS, CN and HCN ALMA observations of GG Tau, with financial support left from her Bourse d'Excellence de l'Ambassade de France, and two months in Japan

with the Hideko group, working on a model of the chemistry at play in star formation.



Thai at Van Mieu after having been awarded a Vallet fellowship

Phuong and Thai have been awarded an Odon Vallet fellowship. In August a few of us attended in Hanoi, together with over hundred alumni, the ceremony celebrating 20 years of Odon Vallet fellowships during which 35'000 scholarships have been offered to young Vietnamese students. Tran Thanh Van and his wife Kim attended the ceremony. Thai is progressing well with her master thesis work on the gravitationally lensed $z=0.7$ galaxy, RXJ1131-1231. She has reduced and analysed the data to produce a lensed image and is now in the process of obtaining the image of the source. Fred Courbin, from the Ecole Polytechnique Fédérale de Lausanne (EPFL), who analysed the same data and published the result last year, very kindly gave her their result in the form of a data cube of the source.

As he does each year, Pierre took part in the jury of the Ta Quang Buu prize and attended the Erice Seminars on Planetary Emergencies where he had been invited to talk about "Science and Culture Needed in the III. Millennium". He explained how such words can be perceived from Vietnam, how they may be understood; his talk was very well received, several attendants from

developing countries mentioning to him after the talk numerous similarities between the situation in their country and in Vietnam.



At the ceremony celebrating 20 years of Odon Vallet fellowships. From left to right: Phuong (lecturer at Quy Nhon University), Thai, Nhung, Kim, Van, Sonino, Hoai, Thao and Phuong.

Finally we received good news from young friends who spent some time with us in the recent past: Ha obtained a Master 2 student fellowship to study at the Observatoire de la Côte d'Azur (Nice), Rishi was awarded a fellowship from University of Florida to study aerospace engineering and Ngan keeps us regularly and very kindly informed of her progress in Torun (Poland) where she studies for her PhD at the Copernicus University; she sends us very nice pictures, one of which you can see in the Photo Album at the end of the Newsletter.

HOANG TUY, MY ELDER FRIEND

Our friend Hoang Tuy passed away on July 14th. His health had been steadily declining for a few months during which he was confined in an armchair at home, spending only the last few weeks in a hospital. Pierre used to visit him once a week, even more frequently toward the end. His brain had remained awake and conscious in spite of the short-term memory deteriorating slowly. He was mostly preoccupied by a few recurring themes on which he would focus his thoughts. He used to say that he was suffering to leave this world while his country was still so much in need of progress, not materially he would specify, but morally. He was in pain for his country, he would explain, not

for himself. He had excellent memories of the two years that he and his wife had spent in Sweden, in the nineties, and was wondering why Vietnam could not enjoy such a happy way of life. He also was often mentioning recollections from his childhood in the Centre of Viet Nam and remarking that his countrymen over there had a much easier life today than they had at the time. He used to say that he was proud to have always said and written what he thought, even if this occasionally caused him some problems. Indeed, a few weeks before he passed away, Tia Sang had collected in a book several of the articles he had written for the magazine; the title is *XIN ĐƯỢC NÓI THẬT*, meaning "Let me be frank". The book also includes a few articles written by friends of his. We copy below the lines that Pierre wrote on this occasion, entitled "Hoang Tuy, my elder friend".



Hoang Tuy in his office at the Institute of Mathematics, being interviewed by Diep for our Newsletter.

I first met Hoang Tuy some sixteen years ago; I was in my fourth Vietnamese year; I met him several times in his office in the basement of the Institute of Mathematics and we immediately became friends, sharing the same views on the need for Viet Nam to improve the quality of its higher education, the same views on the difficult challenge that it represents, the same views on how to approach the problem. Since that time, our friendship has never failed.

I am ten years younger than Tuy; short enough a time for us to understand each other in depth; but long enough a time for me to listen to him with the respect one owes to an elder friend. I was barely eight years old, enjoying the recent

peace in a France that had just been freed from the German occupation, when he was eighteen years old, having to interrupt his university studies in Ha Noi because of the French war and to move to the South; he then started teaching mathematics in high school and entered the four decades of wars, starvation, pain and torment that Viet Nam was going to endure.

Soon after we met, Tuy introduced me to Viet Phuong and the three of us got rapidly in the habit of sharing a lunch once in a while. By sharing with me what they have gone through over the past seven decades, they have made me love their country deep in my heart. These lunches were the occasion for us to exchange views on the situation of the country in general and of education and research in particular. The intellectual and moral values to which we attached importance were the same. It was also for me the occasion to learn about the state of mind in Vietnamese intellectual circles, to become familiar with the ideas expressed by their friends, to whom they introduced me. It was the occasion to learn about their discussions and their effort to help the country progress faster toward the better tomorrow for which they had been fighting all along. It was also the occasion to learn how difficult they were finding to make themselves heard and understood, how difficult it was to withstand the ambient conservatism and to stay true to their revolutionary spirit that demanded a constant determination to change to the better in order to best adapt to an incessantly changing world. I still do not understand how one can oppose intellectuals who devote their life to the love of their country and to making it progress and develop; their in-depth understanding of its recent history, of which they have been actors, places them in a privileged position to know where to go next, which road to follow; their objectivity, their knowledge and their wisdom makes their analyses and their vision of the future highly respectable and worth of serious consideration; while true to the ideal of independence, freedom and justice that governed the birth of the nation, they understand that the world is changing: they know that instead of making the doctrine of yesterday become a rigid dogma, nations need to adapt its letter to the current social and geopolitical

environment while respecting and preserving its spirit and the moral values on which it rests. In 2007, I had the honour to meet General Giap, who was eager to see education develop and its level improve in quality. I had listened to him plead for a change of style in Vietnamese universities; having taken my hand in his, he had told me to keep fighting. To me, Hoang Tuy and the circle of intellectuals to whom he was close were the heirs of his legacy.

A few days ago, chatting with Tuy about what I intended to write in the present lines, he told me that his pride was to have never departed from his determination to say and write what he thinks. He added that such frankness had been, in occasions, causing him some trouble but that he never regretted it. To me, such demonstration of human dignity is calling for utmost respect: I see Hoang Tuy as a model to be followed at the same time as I have for him friendship and tenderness.



In 2005 Hoang Tuy visited to our small observatory on top of the Institute for Nuclear Science and Technology; he is seen there with Nhung and Pierre.

The admiration that I have for Tuy and those of his generation who have contributed to the early years of the young Vietnamese nation is immense. The hopes they had, when they were young, for brighter tomorrows may have been partly deceived, but so much has been accomplished. Foreigners, including many Viet Kieus, who look at today's Vietnam from far away, and young Vietnamese ignorant of the recent history of their country, as unfortunately

quite a few are, wear blinkers: they are short-sighted, they only see what is close to them in time and in space; they lack the broad vision that is required to understand the country in depth. The lesson that Tuy and his friends teach us is a lesson of humility and optimism; an encouragement at looking always forward in a positive and constructive way rather than complaining about the many flaws that still need to be taken care of; an encouragement at pursuing what they have been tirelessly fighting for, while staying always true to the basic values of intellectual and moral rigour that make human dignity.



Viet Phuong and Hoang Tuy visited us at the Institute for Nuclear Science and Technology in 2012.

When I think of Hoang Tuy, of Viet Phuong, of Dang Van Viet and of their destiny, I often remember a famous novel by Tomasi di Lampedusa: *Il Gattopardo, The Leopard* in English. The novel became famous in the mid-sixties when Luchino Visconti based on it one of the most beautiful movies of the past century, with Burt Lancaster, Claudia Cardinale and Alain Delon in the leading roles. Don Fabrizio, a Prince of the Sicilian aristocracy, witnesses the insurrection of Garibaldi's red shirts, the ruling class abdicating their privileges and power to the middle class; he sees with tenderness and indulgence his nephew join the insurgents, animated by the romantic dream of a brighter tomorrow; he sees with sorrow and sadness the mediocrity and selfishness of some of the *nouveaux riches* replacing the tradition of nobleness and the sense of honour that had been his creed all along; he sees with a mixture of resignation and hopeful optimism his nephew

getting engaged with the marvellous daughter of Sedara, a corrupted and ambitious dignitary of the new regime; and he muses with nostalgia, disenchantment and melancholy on the eternal return of history; all seems to be changing but in fact it all remains the same.

In 2005, I had invited Tuy to visit our young astrophysics research team at the Institute for Nuclear Science and Technology that was hosting us. His exchanges with my young colleagues left a deep impression on them and they expressed the desire to learn more from him. At that time, he had been implied in advising the Government on matters of science and education and we had heard of his deep and thoughtful analysis of the weaknesses of the Vietnamese university system and of his pertinent recommendations aiming at overcoming the many obstacles. We asked him whether he would accept to answer a few questions for us, we would then publish the interview in our Newsletter, and he immediately and very kindly agreed. I have read it again before writing these few lines and I have been impressed by the acuity of the vision he had of the problems that need to be solved, by the pertinence of his comments and by the rightness of his analysis. At the same time, I must confess how depressing it is, when reading such documents, to note how little progress has been accomplished in more than thirteen years. The interview can be accessed on the web¹ and here I quote only a few sentences that I find still very much inspiring thirteen years after they were stated:

[...] In short, the style and atmosphere of university training differs deeply from what it is in most, at least in the better, universities around the world. This is probably why there is not a single Vietnamese university in the regional (South East Asia) list of the top 60's. The problem is that this situation has now been lasting for decades. It has been like that for such a long time that many people consider it normal and do not even imagine that it might change. Today, in particular, several persons holding important responsibilities in the university system still think

that an education of high quality is possible without research activities.

[...] If we want to modernize our universities and develop science, it is necessary to send a number of young talents abroad. [...] However, this has generated a disastrous brain drain: those who are the most successful are offered attractive jobs abroad, both financially and in terms of independence and responsibility, and most of them do not return to the country. Under such conditions how could science, research and education, develop in Vietnam? In order to stop such a brain drain we must first recognize our failure to give our young talents sufficient motivation and loyalty to the country. The main reason is the absence of science centres of high enough a level, where they could do research in a good intellectual environment and with sufficient resources.



On the occasion of the 2012 visit, from left to right: Hoai, Nhung, Pierre, Diep, Thao, Viet Phuong, Hoang Tuy and Hiep.

[...] The main weakness and the most negative factor in Vietnamese education and science, from kindergarten to university (including master and PhD training), is that teachers and researchers receive a salary that covers only one quarter of their needs, taking in due account the cost of living in the country and the standard of living that fits their position and role in the society. The remaining three quarters have to be found elsewhere. And of course they usually are. This means that it is not the money that is lacking but the way in which it is handled. We often hear “everybody is complaining about low salaries, but they are still properly living” being used as an

¹

<https://vnsc.org.vn/dap/files/VATLYNEWSLETTER5.pdf>

argument to preserve the present situation. This kind of management is so irresponsible that many suspect that the only reason for its being preserved is the need to hide corruption. Having had such an insane salary policy for decades, many bad habits have developed, some officers have become deceitful. [...] We have seen in the past many good ideas that had been accepted higher up, fail badly once incompetent bodies had been entrusted with their realisation.



Hoang Tuy and Pierre at the 85th birthday celebration of Hoang Tuy organized by Tia Sang

Seven years ago, we invited Hoang Tuy and Viet Phuong to spend some time with us before sharing a lunch at a nearby restaurant. Nguyen Thi Thao, a young member of our research team, reported about the event in an issue of our Newsletter that starts with a quotation of Hoang Tuy: *Our wage policy has no equivalent in the world. It despises those who are devoting themselves in the shadow to teaching and to growing fruits that others will harvest. Strange paradox of a country, which thinks nothing of its teachers and which, according to tradition, is supposed to praise teaching and highly respect knowledge.*

The account by Thao of Tuy's and Viet Phuong's visit can be read on the web². She says how Tuy was talking about the need for a better education: Past and present were intertwining in his words, with morality and integrity as a leitmotiv, illustrated by many examples. He told us how essential it was for us, young scientists, to

adhere to strict intellectual and moral rigour. The conversation was jumping over generations, mixing white and black hairs, united on the front of fighting for a better education. Happiness was radiating from our smiling faces. And Thao finds the right words to summarize the impression the visit had left on them: The youth in their words and in their hearts and the lucidity with which they were looking at the world around them were contrasting with their old age. We shall never forget the message that they handed down to us: integrity, creativity, freedom, democracy.

Indeed, Tuy has kept in him this ability at marvelling which children have but which so many adults have lost; he has kept in him the freshness of emotions and the purity of judgement that are the assets of the youth. When blended with the wisdom of age and the experience of the outstanding chapter of Vietnamese history that he has been witnessing over so many years, they make him the most lovable of men.

OUR PRESENCE IN ASIA

In the wake of a visit that Paul Ho paid to us in September, Diep reports about our presence in Asia, in particular in East Asia and South-East Asia by reviewing briefly organizations to which we belong or at least to which we are close and events such as meetings, workshops, schools and conferences which we attend.

Within Asia, we actively participate in the South-East Asian Astronomy Network (SEAAN) and the East Asian Observatory (EAO). These organisations provide an excellent collaboration framework for the Southeast Asian and East Asian astronomers at regional and international scales, though they are different in nature. SEAAN is a society of astronomers from South-East Asia while EAO is an international observatory with annual running budget contributed by its member countries. Before officially joining these organisations, we had and still have traditional collaborations with colleagues from France. Several of us made our PhD theses in a joint supervision framework with University of Paris 11, University of Paris 6, University of Toulouse, University of Bordeaux, and Paris Observatory. In

²

<https://vnsc.org.vn/dap/files/VATLYNEWSLETTER15.pdf>

addition to that, from time to time we have contacts with colleagues from the International Astronomical Union (IAU), the Asia-Pacific community, and CSIRO Astronomy and Space Science (CASS, Australia). The collaboration with the latter communities and institution is usually in the form of organising conferences, workshops, and schools. As an example, I am currently serving on the Science Organising Committee for the next 14th Asia-Pacific Regional IAU Meeting (APRIM) hosted in Perth, Western Australia in July, 2020.



Diep giving the national report at the 8th SEAN meeting in Hanoi

SEAN was initiated by the National Astronomical Research Institute of Thailand (NARIT) in 2007 with the aim to strengthen the research work and education activities among the eleven member countries in Southeast Asia. At the time the Association of Southeast Asian Nations (ASEAN) consisted of only ten member states. In 2011, Timor-Leste announced its intention to become the eleventh member of ASEAN. SEAN organises annual meetings and publishes the proceedings. We joined SEAN around 2010 when learning about the existence of the network; since then we have been regularly attending its annual meetings.

Among the SEA countries, in terms of astronomy and astrophysics (A&A) development, Thailand with NARIT as the leading institute is outstanding. Officially established in 2008, NARIT, with its headquarter located in Chiang Mai, is expanding very fast. They are operating a 2.4 m diameter optical telescope – their first national astronomical facility – and constructing a

National Network for Radio Astronomy and Geodesy (NNRAG), ultimately becoming the “Thai VLBI Network” or TVN. VLBI stands for Very Long Baseline Interferometer, a technique combining several telescopes to increase the ability to distinguish nearby sources in the sky. TVN is the Thai second national facility which is now in its first phase of construction in the northern part of Thailand; it includes a 40-m single-dish radio telescope and a 13-m VLBI antenna to be inserted in the existing VLBI networks of East Asia, Australia and beyond for high spatial resolution science as well as for geodetic applications. NARIT also owns the 0.6 m Thai Southern Hemisphere Telescope (TST, Chile) to observe the quickly evolving Gamma Ray Burst afterglows and is building Evryscope for the Arctic and Antarctic (EVA); EVA is the first ultra-wide-field synoptic sky survey to be conducted from either Pole, enabling almost full-sky coverage and high temporal cadence for the studies of exoplanets, stellar variability, asteroseismology, and supernovae. In addition, NARIT is maintaining five regional observatories equipped with 0.5-0.7 m optical telescopes scattered on five zones of the country and a 4.5 m diameter radio telescope for training school and university students. By the end of 2017, NARIT had 29 staff members, training 19 students at all levels, publishing 21 and 58 scientific articles in refereed and non-refereed journals respectively. NARIT is hosting the International Training Centre in Astronomy under the auspices of UNESCO and has established collaborations with 74 institutes and universities inside and outside Thailand. Following Thailand, Indonesia, Malaysia, Philippines, and Vietnam share the second place, even if the level of their development varies slightly from one country to the next. The other SEA countries are less active in A&A but they do show interest in including astronomy in their curricula and increasing public awareness of the importance and attraction of astronomy.

On 24 August 2016, VNSC signed a memorandum of understanding (MOU) with NARIT to strengthen the collaboration between the two institutions. Following the signed MOU, in December 2017, VNSC and NARIT co-

organised the 8th SEAAN meeting in Hanoi; following it, in July 2018, we co-organised a workshop entitled “NARIT-VNSC Astronomy and Astrophysics Workshop” in Nha Trang with participation of high school teachers, university lecturers, and young researchers from the Southeast Asian and neighbouring regions. In the first half of next year, we will organise another workshop focusing STEM education, a topic which recently attracts much interest in Vietnam and Thailand. A big gap has been filled between the minutes of the 2010 SEAAN meeting, which deplore that the absence of “*formal way to approach Vietnam caused problems*” and today: Vietnam has now fully integrated in the activities of SEAAN; we attend SEAAN meetings; we joined science working groups and a committee to amend the SEAAN charter; we take part in the assessment of projects applying for the allocation of IAU funds (SEAAN is an IAU regional node). Besides the collaboration with NARIT we have contacts and exchanges with colleagues from Malaysia, Indonesia, Philippines such as sending people to attend or co-organise schools, meetings and workshops organised by and in these countries. As an illustration Tuan Anh gave a lecture at the International Lunar Observatory Association *GALAXY FORUM* in Jakarta in February 2017; Thai, Tuan Anh, and Phuong attended the conference on “Big data for Southeast Asian Development” in Bangkok in September 2019; Thao and Dung will most likely attend the ASEAN Astronomy Workshop for Teachers from 26-28 December 2019 at Universiti Teknologi Malaysia, of which I am a SOC member.

As mentioned above, we had the great pleasure, in September, to welcome the visit of Dr. Paul T. P. Ho, Director General of the East Asian Observatory. Our participation in the EAO was mostly made possible thanks to Paul. We got to know him several years back. Our first interaction with him was via “Internet”. It was in 2015 when we just moved from our former Institute for Nuclear Science and Technology to VNSC; our directorate had asked us to write a plan for building a national astronomical facility. We wrote a plan analysing the current situation of astronomy in Vietnam which is underdeveloped

and we drew a ten-year plan focusing on the development of high quality human resources. It is a flexible plan: depending on the progress made while the project develops, the time schedule could be longer or shorter. Before handing it over to our directorate, we asked for comments from several astronomers who have experience in developing astronomy and astrophysics (A&A) research and education. Paul was one of them. We got useful comments from them and they also shared with us a lot of their precious experience which they had while developing A&A in their own countries; in particular Paul shared with us a lot of difficulties and lessons that he experienced while developing the Academia Sinica Institute of Astronomy and Astrophysics. Such was the first nice contact we had with Paul.



Vietnamese participants in the Big Data workshop in Bangkok. Thai, Phuong and Tuan Anh are respectively second, third and sixth from right.

In 2016, sponsored by VNSC and Rencontres du Vietnam, we organised, together with Nguyen Trong Hien from NASA, in Quy Nhon a workshop entitled “*Astronomy Development in Vietnam – Challenges and Opportunities*”. We obtained the participation of most of the astronomers active in the country, of the former DG of the National Astronomical Observatory of Japan, Dr. Masahiko Hayashi, of the former chair of the Korean Astronomical Society, Dr. Young-Chol Minh, of Dr. Kaz Sekiguchi (NAOJ) and of some other Japanese experts... and of course of Paul. During the workshop we listened to talks given by our foreign colleagues sharing their experience in doing research, diversifying funding sources,

selecting and building suitable astronomical instruments, etc. On our side, we talked about our work, our future plans, and we had a lively round table discussion on how to develop astronomy in Vietnam with the contribution from the audience. The foreign astronomers attending the workshop expressed their commitment to help Vietnam in developing A&A research and education. Paul on behalf of the foreign participants said that they will be always willing to come back and give a helping hand to Vietnam on this task. Since then, Paul has been back to Vietnam many times, witnessing our difficulties, discussing with us to find our ways to develop A&A in the country, encouraging us to move forward in joining the efforts of the international astronomer community to do frontier research, in particular pressing us to join EAO. Sometimes, it was just a short visit to see the progress and to talk with us. We are deeply grateful for the goodwill to help Vietnam from Paul and our foreign colleagues. It really means a lot to us. If we had people like Paul in Vietnam we would be very happy. During this year's visit of nearly one week Paul gave two seminars, one at Hanoi University of Science on the first image of a black hole with the Event Horizon Telescope (EAO is a part of it), the other at VNASC on EAO on the occasion of the 8th anniversary of establishment of VNASC.



The SEAN Charter working group visiting the regional observatory near Astropark in Chiangmai

Currently, Vietnam is a member of EAO under observer status. The agreement was signed between EAO and HCM National University as the representative for Vietnam in 2017. More SEA

countries have joined or are in the process of joining EAO, including Thailand, Malaysia, and Indonesia. Under this framework, Vietnamese astronomers could have access to all the facilities of EAO. Currently, the main facility which EAO is operating is the James Clerk Maxwell Telescope (JCMT) and EAO has access to the Sub-millimetre Array (SMA) and the United Kingdom Infra-Red Telescope (UKIRT). Before officially joining EAO, we already participated in several meetings organised by East Asian member countries such as APRIM 2014 in Daejeon, South Korea, the EAO meeting at Seoul National University in 2018, the 2015 and 2017 East Asian Young Astronomers Meetings (EAYAM2015 & 2017) in Taipei (Taiwan) and Ishigasaki (Japan) and, in 2015, a conference on the early science of the Five-hundred metres Aperture Spherical Telescope in Guizhou, China. In all cases, we could attend these conferences thanks to the financial support of the local organising committees or of EAO member observatories.



Attendants of the EPAR school at Tay Nguyen University in Buon Me Thuot. Tan, Mark and Tuan Anh are respectively first, fourth and last from left.

We welcome many visits of astronomers or delegations from EA regions: NAOC, NAOJ, KASI, and ASIAA. As an EAO observer member, we joined some large programmes of the JCMT and are analysing data from programmes such as B-fields In STar-forming Region Observations (BISTRO) and The Nearby Evolved Star Survey (NESS). Tuan Anh took a shift to operate the JCMT in May, in Hawaii; I will join the JCMT Time Allocation Committee in Hawaii. EAO was initiated the by East Asian Core Observatories Association which consists of four core

observatories in East Asia (NAOC, NAOJ, KASI, ASIAA) to foster and coordinate collaborations between the major astronomical observatories in the region. The role of EAO is to create a framework for East Asian and Asian countries to combine and increase resources in the region both in terms of finance and expertise. The ambition of EAO is to be the counterpart of ESO, to be able to contribute to the construction and exploitation of the largest telescopes of the future, such as ELT, TMT and SKA and to lead astronomical research in East Asia as ESO is doing in Europe.

To be frank, I think that Vietnam is not yet ready to fully join such a big science international collaboration on an equal footing basis, namely to join EAO as full member and pay its annual membership fee. But we are determined to do our utmost for this to happen as soon as possible.

A PLEA FOR THE INCLUSION OF BASIC RESEARCH IN A & A IN THE 2020-2030 NATIONAL S & T PROGRAMME

At the end of March we worked on a report that Pham Anh Tuan, the head of VNSC, had requested from us. Originally, he had asked us to comment on the National Space Programme that was meant to be updated for the period 2020-2030. Our main comment was a request to include research in astronomy and astrophysics in the Plan (it is absent from the present version). Anh Tuan asked us for a report making the case for such an addition and Diep handed over the final report on April 4th. The executive summary is copied below. The report has been well received by our Directorate and Anh Tuan engaged himself to defend our case in front of the authorities.

1. Members of the Government have recurrently declared their determination to support and develop science in the country with high priority. Basic science is unanimously recognized as essential on the long term for securing a sustainable development. However, given the many challenges and emergencies that the country has to face in a rapidly changing world, the resources that can be dedicated to basic research are necessarily limited. Consequently the selection of the fields that one can afford to support and the

definition of the nature and level of such support must be made with great care. In particular the selected fields should stand at the frontier of knowledge; there should exist in Viet Nam at least one research team of international stature having demonstrated its potential for growth in both excellence and size; the resources, both material and human, that the field requires in order to develop should match what the country can realistically offer; serious links with the international scientific community should exist to secure an efficient development of future collaboration; strong links with Vietnamese universities should exist in order to help with the necessary improvement of the quality of higher education in the country and with the fight against brain drain; the field should have the potential to appeal to the public and foster its interest at a level sufficient to justify the resources that it needs; the field should have some relation with applications and/or technologies that are relevant to the development of the country.

2. Astrophysics, given its current status in Viet Nam, has been shown to satisfy all above criteria. Together with molecular and cell biology, it is the field of natural sciences that is developing most rapidly in the world and which poses to science its most puzzling unanswered questions. There exists in Viet Nam a research team active in the field, having demonstrated its excellence and potential for growth by the quality and quantity of its publications at international level. The resources required, in the coming few years, are essentially limited to support for attending schools and conferences, for visiting or inviting for short stays foreign colleagues, for securing the level of wages and project funding at a sufficient level allowing for a reasonable growth. The existence of excellent relations with the international scientific community and their potential to develop, has been demonstrated, in particular with East and South-east Asia. The current contribution of Vietnamese astrophysicists to higher education has been shown to be very active and to call for a fast and important development. The role that they play in fostering the interest of the public for astronomy and space sciences is already important and can be expected to increase significantly in the years to come.

3. In such a context the inclusion of basic research in astronomy and astrophysics in the 2020-2030 S&T programme on space technology is timely and well justified. It will provide the seed for the field to progress; the seed for the DAP/VNSC/VAST research team to grow in both excellence and size in proximity to the space technology community; the seed for the support that the field can provide to the country in terms of sustainable development to increase in domains such as higher education, international relations, and most importantly the need for the country to evolve from cheap-labour-based to knowledge-based economy.

4. The proposed inclusion of a paragraph on basic research in astrophysics in the long-term plan could take the following form: Conduct and publish the results of basic research in space related domains, and in particular in astronomy and astrophysics; promote international collaboration with prestigious foreign research teams; promote the exploitation of existing scientific instruments operated at the frontier of current technology, such as the James Clerk Maxwell Telescope and the Atacama Large Millimetre-sub-millimetre Array; promote the training in astronomy and astrophysics at bachelor, master and doctoral levels, in particular in collaboration with Vietnamese universities; promote outreach activities aimed at fostering the curiosity and interest of the Vietnamese population for astronomy and space science and technology; be the seed for the development of a community of Vietnamese astrophysicists growing progressively in size and excellence with the ambition, on the long term, to give outstanding contribution to the field on the international scene.

THE HOA LAC TELESCOPE

The Hoa Lac Observatory of the Vietnam National Space Centre (VNSC) has been commissioned in June 2018. It hosts a 50 cm (f/8) Ritchey-Chrétien reflecting telescope equipped with a CCD array in the focal plane. Thao, together with Dung and Loc, are taking care of its operation and exploitation. Recently, they submitted a paper for publication in the Vietnamese Journal of Science, Technology and Engineering summarizing the

main features of the instrument and presenting a detailed study of the CCD camera. The conclusion of the article, which we copy below, states clearly the need to collaborate with universities in order to make the best possible use of the instrument.

The exploratory and introductory measurements that have been performed over the past year and that are described in the present article have demonstrated the high quality of the Hoa Lac observatory telescope as a scientific instrument of outstanding potential in terms of training bachelor and master students. It is now essential to make sure that the important investment that the acquisition of such an instrument represents is made use of as efficiently as possible. In particular, it must be made accessible to those who are most likely to make good use of it, namely university students and amateur astronomers.



The Hoa Lac telescope

Ideally, a scientific instrument should be granted a yearly operation and maintenance budget at the level of a significant percentage, say 5% to 10%, of the initial investment cost. Ideally also, for a proper exploitation of an optical telescope, weather conditions should be such that the fraction of clear nights during which observations can be performed should well exceed 50%. Unfortunately, in the present case, none of these two conditions can be realised. The operation and maintenance budget available for the exploitation of the telescope is negligible and cloud coverage is such that less than 10% of the nights are clear enough to make observations possible. In order to overcome these handicaps,

active cooperation with universities and astronomer clubs is mandatory.



Picture of the Orion Nebula taken with the Hoa Lac telescope (100 s exposure time, 19 January 2018). This is part of Figure 17 of the article.

The potential of the telescope as a training tool is twofold: it covers the fields of pure instrumentation and of astronomy observations. The present article has given an idea of what the former may include, continuing the exploratory measurements that have been described in order to reach a detailed understanding of the telescope geometry and perform observations of the highest possible quality. In particular horizontal coordinates of the orientation of the “altaz” rotation axes of the telescope mount need to be accurately measured, together with the precise location of the optical axis and of the CCD array. Detailed properties of the optical system need to be studied. Third party access to the software should be available. Saturation of the CCD array currently prevents taking pictures of bright targets such as the Moon and planets; solutions have to be found to overcome this problem. The pointing accuracy should be optimized. A system or procedure allowing for operation at negative temperatures without ice formation on the CCD array needs to be implemented.

For what concerns astronomy observations, in addition to collecting pictures of

the highest possible quality, a study of bright, short period variable stars is an example of the kind of observations that could be made in the period during which cloud coverage is not too important, typically between October and April. Figure 17 shows pictures that illustrate the current performance of the telescope optics.

The research work of the team of the Department of Astrophysics of the Vietnam National Space Centre, who is authoring the present article, covers a domain of astronomy and astrophysics essentially disconnected from what the Hoa Lac telescope can access; it uses instruments, such as the Atacama Large Millimeter (submillimeter) Array having sensitivities and angular and spectral resolutions four orders of magnitude larger. Yet, the team will always be available to provide advice and guidance to potential users.

In summary, the opportunity of using the optical telescope of Hoa Lac observatory should not be missed by universities and amateur astronomer clubs. To the former it provides access to a highly performing scientific instrument, with which bachelor and master students can be trained and learn the constraints of rigor and professionalism inherent to the practice of science. To the latter, it offers an opportunity to observe the night sky with one of the best instruments available in the country.

OUR WORK ON AGB STAR R DOR

Following up on our work of AGB star EP Aqr we used archival ALMA observations of AGB star R Dor to further our exploration of very large wind velocities, typically twice terminal, in the close environment of the star. The results raise some puzzling questions on the origin of such high velocities. At the same time we revealed the presence of ejected material at larger distances from the star suggesting the occurrence of an episode of enhanced mass loss a century or so ago. We report briefly about this work.

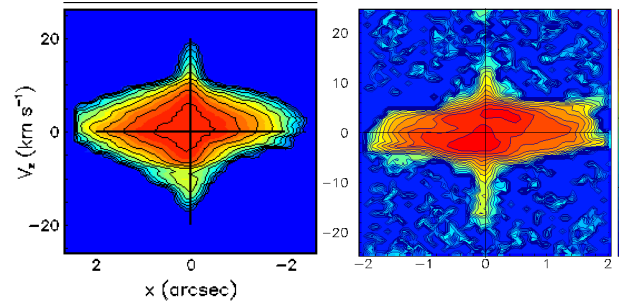
As reported in previous Newsletters, we have found evidence for the unexpected presence of polar gas streams emitted in the nascent wind of an oxygen rich AGB star, EP Aqr. EP Aqr is an

evolved star that left recently the Red Giant Branch to enter the Asymptotic Giant Branch (AGB). The evidence is from the presence of high velocities, twice as high as the terminal velocity, along the star axis and at short distances from the star. It is particularly strong in the emission of the SiO line, which probes preferentially distances smaller than 100 au where the gas has not yet fully condensed in dust grains. But it is absent from the emission of the SO₂ line, which probes much shorter distances from the star, below some 20 au, because it is both excited and dissociated by the stellar UV radiation. The SO₂ emission gives instead evidence for rotation about an axis that is the same as the symmetry axis of the terminal wind and, in the particular case of EP Aqr, happens to be close to the line of sight. The picture is therefore of a star having expanded to a radius of some 2 au, surrounded up to some 20 au by gas in rotation, developing polar gas streams reaching a velocity of 20 km/s along the rotation axis up to a radius of nearly 100 au and settling down to an axi-symmetric configuration up to some 1000 au where it is best probed by the CO molecule, with a terminal velocity not exceeding 10 km/s.

Recently, an oxygen-rich AGB star in the same early stage of evolution as EP Aqr, and having very similar size and temperature, R Dor, has been observed by ALMA with excellent angular resolution. Two European collaborations have analysed the data, focussing on the emission of molecular vibration excitations that probe the very close environment of the star, below some 20 au, as was the case for SO₂ in the study of EP Aqr. And, as was the case for SO₂, they find evidence for rotation with similar rotation velocities as for EP Aqr but about an axis making this time a large angle with the line of sight. In addition, one of the two collaborations noted the presence of very high velocities in the emission of SiO lines in the vibrational ground state, probing larger distances from the star; they are much higher than the terminal velocity, reaching some 20 km/s as was the case for EP Aqr, but this collaboration did not explicitly analyse the relevant data. We therefore decided to study this star using the same ALMA observations as studied by them (they had become openly accessible), together with other open

access archival ALMA observations that had not been exploited by anyone. In contrast with the published studies, our work focuses on rotational excitations in the vibrational ground state, probing distances well beyond 100 au.

At variance with EP Aqr, we find that R Dor terminal wind displays strong inhomogeneity, both angular in the form of cores of enhanced emission and radial, giving evidence for episodic ejection of material. No axi-symmetry can be observed about the rotation axis revealed at short distances from the star; in particular, the line of sight plays no special role in the morpho-kinematics of the terminal wind. These results have been published in MNRAS.

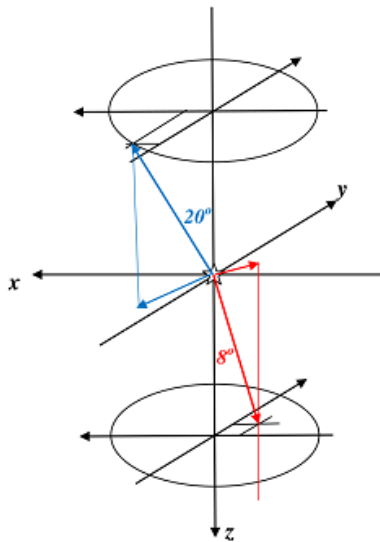


Position-velocity diagrams showing the presence of gas streams along the line of sight for EP Aqr (left, SiO[5-4] emission) and R Dor (right, SO[6-5] emission).

Concerning the high velocity wings of the spectrum, which had motivated us to study this star, we find that they are again confined near the line of sight, as was the case for EP Aqr. This comes as a surprise since the line of sight, which is the symmetry axis of EP Aqr, does not seem to play any particular role in R Dor. It raises an obvious concern about the reality of the gas streams that might be suspected to be instead the result of artefacts or of some other effect that would have been overlooked. As such concern applies to both EP Aqr and R Dor, it became essential to review critically the evidence we have for the presence of gas streams. We eliminated a possible artefact caused by insufficient subtraction of the continuum emission of the star and considered two candidates for mimicking the presence of gas streams: gas rotation and star pulsations. But both would have to produce very sudden accelerations and require that the velocity

of 20 km/s be reached very close to the star where high velocities are not observed; moreover they would predict exact back-to-back configuration and red-shifted/blue-shifted symmetry, which is not quite the case for R Dor.

At present, we are therefore unable to produce a convincing picture of the physics mechanism causing the presence of the observed high velocities. The most natural description that matches well observations is in terms of gas streams; but it is difficult to convincingly claim that their alignment with the line of sight in both EP Aqr and R Dor cases is pure coincidence. Descriptions in terms of gas rotation or star pulsations imply very sudden acceleration that is not supported by their absence from line emissions probing the very close environment of the stars.



A possible geometry of the R Dor gas streams along the line of sight (z axis).

Another unexplained feature of the nascent winds of both EP Aqr and R Dor is the presence of rotation velocities of a few km/s at a distance of some 10 au from the stars: at such distances, the original angular momentum of the Main Sequence star should have become diluted to negligible values. The possible presence of a close by planetary companion may be a key to the solution of both puzzles.

The paper was first submitted as a letter to MNRAS but two anonymous referees made negative assessments of its content on the basis of several blatantly wrong claims; they were

obviously in relation with the collaborations that proposed the original observations and published the original results; we believe that they oppose the idea that people who were not involved in the proposal can access the data and publish analyses that, if not contradict, at least add significant substance and information to what they have published. We are helpless and defenceless in front of anonymous judges who use their power instead of rational arguments to attack us unjustly (and the statements of whom we cannot even quote because the journal would consider that a breach of confidentiality). Fortunately, the Editor in Chief of the journal gave us a chance to resubmit the letter as a new article, to which we had added information preventing a new referee from making the wrong claims that the first two referees had made.

In this context, and before having received the report of the second referee, it so happened that Jacco Van Loon, Head of Division G of the International Astronomer Union (IAU), sent a mail to all members of the division informing us of his decision to launch “*the IAU Division G ombud*” and inviting us to let him know of situations when we may have felt “*to be treated unfairly or unrespected*”. We reported to him about a similar earlier experience with a referee from A&A and we copy below a few words from his answer: “*Thank you very much for your detailed and carefully worded report of your experiences. Many of the things you mention I think are not specific to your group, or Vietnamese researchers, but much more common place. [...] On a personal note, my view is that reviewers often get away with making unfair judgments under the cover of anonymity, and I am very much in favour of removing anonymity from any reviewing process. I always waive anonymity (sometimes overruled by the editor or panel though). Of course there would be a danger for repercussions when a review is unfavourable, but that too should be tackled.*”

OUR PARTICIPATION IN USTH

This summer, we welcomed three interns of USTH who worked with us for two months. Nhung reports on the experience. This gives us an

opportunity to comment on our relation with this university, our wish to see our contribution better recognized and the need for USTH to be more motivated by the task of promoting basic research in Viet Nam than of contributing to the constantly increasing brain drain.

A year and a half ago, in Newsletter nr 27, Diep gave an excellent summary of the strong and friendly relations that we are maintaining with the Department of Space and Aeronautics (DSA) of USTH. What he wrote then still applies today. Diep, Thao, Tuan Anh and I contribute to USTH training by giving lectures and supervising labwork for bachelor and master students. We keep close and friendly contact with other lecturers and both present and former DSA students. From time to time former DSA students contact us and tell about their progress and/or ask for help or advice, which we are always happy to give.

This summer, we welcomed three DSA students for their two-month internships at the end of their M1. Two students, Judith and Morteza, worked with Hoai and me on a simulation of the polar gas streams from AGB stars. This topic is related to our recent study of EP Aqr, which gave evidence for two narrow polar jets in the nascent wind of the star. The special geometry of EP Aqr, with the polar axis being nearly aligned with the line of sight, is particularly favourable to reveal the presence of such jets. The students used simple models of the effective emissivity and velocity fields of EP Aqr to study the detectability of the polar jets depending on inclination angle and jet length. They worked together most of the time. Each had his or her own strength: they could help each other to learn faster and work more efficiently. In addition to working on the simulation they spent much of their time acquiring basic knowledge of stellar physics, in particular about AGB stars, and related methods and techniques. We were very happy with their performance during the internship. Of course, since most of their work was made in common, it is difficult for jury members who were not in direct contact with them to detect small differences between their respective performances. But this is not important. We had

the same good experience with students working in team in the past, as was the case of Tuan and Thanh, also for their M1 internship, who worked together on solar flares detected by our 2.6 metre diameter radio telescope.



Celebrating the end of Judith and Morteza's internship: they offered us a thankful cake.

The third student, Ha, worked with Thao on the Hoa Lac optical telescope. She joined us when Thao was finalizing a paper on its performance. Ha studied the pointing accuracy of the telescope using two series of observations that Thao had made earlier. She contributed to the analysis and quickly became familiar with it. Unfortunately, during her internship the sky had not been clear enough to allow for additional observations; but she learned about the structure of the telescope and its principle of operation. She showed much dedication to her work, which she did in earnest, of good omen for her future research work. The paper has been completed and submitted for publication in a Vietnamese journal. The telescope is a highly performing scientific instrument, which would be an ideal tool for training students. We hope that we can collaborate with universities in Hanoi, such as USTH, to exploit it efficiently.

Diep's report in Newsletter 27 was ending with a statement of our wish to strengthen our collaboration with USTH *"in particular by asking to be accepted in the doctoral programme as co-supervisors of PhD theses in a co-supervision (cotutelle) agreement framework, but our offer did not receive a friendly welcome yet. We shall nevertheless keep pushing the idea with the DSA directors with the aim of establishing a more*

formal collaboration between USTH and the Department of AstroPhysics of VNSC”.

Meanwhile, we had several exchanges of views with Yannick Giraud-Héraud and Ngo Duc Thanh, in charge of the DSA. These were always open and friendly, each of us understanding well the situation, but no progress could be made. Unfortunately, the reasons behind this failure are deep and go well beyond what either we or the DSA can influence.

Our request is simple: that USTH and Vietnam recognize the quality of our work and help us by making it possible for us, in particular financially, to train USTH students at PhD and master levels; currently this training is exclusively made abroad and financial support is exclusively given to students working abroad. We consider that the aim of DSA should be to help with the creation in Vietnam of a solid nucleus of excellent researchers acting as a seed to build a set of competent research teams competitive on the international scene. It should not be to select the best students and help them with leaving the country and contributing to the constantly increasing brain drain. We have given ample evidence that the quality of the work that we offer to students being trained with us is well at the level, if not better, than that of the work offered to the students being trained in France. In particular we have already trained several PhD students (not from USTH but from HUS, HUST or HNUE) under a programme of joint supervision (co-tutelle) between France and Vietnam, who have all brilliantly obtained their degrees.

Small details make us feel that we are not properly treated; for example, none of us was invited, or even simply informed, of the opening ceremony of the academic year 2019-2020 that was held at USTH on September 26th; none of us was invited, or even simply informed, of the ceremony of appointment of a new rector, Pr Etienne Saur, that was held at VAST on September 17th; both events took place at walking distance from our office. Similarly, when Judith, Morteza and Ha presented their internship work, it was by Skype in front of a French jury in Paris. But Diep, Hoai and Nhung were not members of the jury and had to leave the room after each presentation to let the jury deliberate without them

being present, although they were obviously more competent to judge to which extent the internships had been successful.

Yet, the problem is not that Yannick and Thanh disagree with our views, they share them. The problem is much deeper and has its roots in the poor opinion that Vietnamese have of their universities and in the lack of determination of the relevant authorities to responsibly address the issue, mostly in Vietnam but also, to a lesser extent, at the level of the French consortium that supports USTH.

Indeed, paradoxically, in contrast with the excessive pride that Vietnamese display by ignoring any advice coming from abroad, Vietnamese parents and teachers teach their children and students, as if it were an evidence, that they must study abroad because the level is so low in the country. The idea that their children and students are as clever as those from abroad and that it is time for the country to make use of their talent to start developing knowledge and competence at home does not even skim over their mind. The result is that the students entering USTH, having been well brain-washed, are mostly motivated by having this way an opportunity to leave the country; they would consider it a failure if they had to study in a Vietnamese team for their master or PhD while most of their classmates have been offered financial support to go and study abroad.

One might think that the Ministry of Education and Training (MOET) would react in the interest of the development of the country, that it would feel concerned about the constantly increasing brain drain, that it would support the creation of research teams at home, in a word that it would behave responsibly toward such a damaging situation... but it does not at all. An illustration is its failure to address the way Viet Nam deals with the award of PhD degrees in cases of co-tutelle, to which we had made MOET attentive some five years ago and for which no progress has been made. When the Ministry is helpless, how could we expect a university, not to mention a small department, to help?

From the French side, we can not hope for much either. At the level of Yannick and Thanh, who understand well the situation in the

Vietnamese context, and who sincerely share our views, we enjoy much confidence and sympathy. However, they also have their own problems, in particular they find it difficult to attract as many students as they had hoped for. But at the level of the consortium (for such matters it is the consortium that matters, not the rector) it would be very naïve, and asking too much, to dream that they might offer understanding and support. Each university sees its own interest, primarily to recruit brilliant students rather than fostering training and research in Vietnam.

Yet, we shall keep fighting by making our utmost to make the relevant authorities attentive to the damage that the ceaseless brain drain is causing to the development of the country and by asking for financial support to allow for our training of USTH PhD students.

TWO WEEKS IN HAWAII

Tuan Anh reports about time he spent in Hawaii with the staff of the James Clerk Maxwell Telescope of the East Asian Observatory, of which one week was dedicated to taking shifts on top of Mauna Kea.

Vietnam became an observer member of the East Asian Observatory (EAO) in 2017; as a result we have been encouraged to join the community and to take part in its research work using the James Clerk Maxwell Telescope (JCMT). It is the largest single-dish telescope, 15 m in diameter, which operates at sub-millimetre wavelengths near the summit of Mauna Kea in Hawaii, 4000m above sea level. We joined a couple of JCMT large projects, which are close to what we are doing in Ha Noi. One of these needed a volunteer observer in May, so I decided to take this chance: at the same time as I would help, I would learn how to operate a submillimeter telescope. As I was the first Vietnamese coming to observe with JCMT, EAO generously covered all my expenses when in Hawaii, for which I am very grateful to Prof. Paul Ho. Unfortunately, I could not get VNESC support to pay for the plane ticket, which Bac Pierre paid from his own money.

I spent a fortnight over there, of which five nights were for shifts on top of the mountain. The

first few days were used to learn about safety and become familiar with some specific scientific issues; the last days were dedicated to data reduction and discussions concerning the result of the observations. This was also an opportunity for me to report on our research at DAP. Dr. Jan Wouterloot was my tutor and took good care of me, waiting for me at the guest house while I was waiting to get my room key, taking me to the nearby supermarket for shopping, briefing me about the safety and other duties when on shift. He stayed with me for a few hours for the first night at the top of the mountain in order to make sure everything was under control. It so happens that he is a prominent member of a large project on nearby evolved stars, in which we are both involved. He shared with me his long scientific experience with analysing sub-millimetre data. We discussed how Vietnamese astronomers could usefully contribute to that project.



Tuan Anh and Jan Wouterloot in the JCMT control room

I first stayed at Hale Pohaku (HP), which means “stone house” in Hawaiian, at intermediate altitude, 2800 m above sea level, for two nights; the idea was to acclimatize to altitude before working at the JCMT on top of Mauna Kea. HP is the base for people working at the summit. It takes forty minutes to drive some twenty miles from the EAO office to HP, but half an hour more to cover the seven miles that separate HP to the top, at 4100 m. The latter is quite bumpy, as part of it is not paved. The view around is amazing, with thousands of Martian-like rocks on one side and a deep valley on the other. At 5.30 pm a telescope

employee drove me up, and back down at 6.30 am the day after. I had dinner before leaving for the top and a “night lunch” for supper. The food at Hale Pohaku was so good, I loved it so much. I became a day sleeper, waking up around 3 pm; sometimes, it was difficult to get to sleep during day time. The first night was a bit tough because of altitude, I got some headache, but soon gone after a while. I learned something new: how to fix a flat tyre at 4000 m above sea level, quite an experience!



Tuan Anh in front of UKIRT

In addition to JCMT, there are more telescopes on top of the mountain: Gemini, Subaru, Keck, UKIRT, SMA, etc. On the second morning, Miriam Fuchs, Mimi is her nickname, guided me for a visit around all of these. It was an impressive way to start a day! The mountain is a sacred site for local people, which has caused several demonstrations opposing the construction of new telescopes. In particular, the construction of the Thirty Meter Telescope has been essentially stopped since 2015; it will hopefully resume at the end of the year. I really enjoyed staying on the summit, the scenery is so impressive when the sun sets and rises. These were the clearest nights I had ever seen, the brightest appearance of the Milky Way. I remember watching the Milky Way while the whole floor under my feet was slowly rotating in a telescope swinging mode, a quiet night and a

bright sky, enjoying the show and feeling so lucky to have a chance to watch it.

There is always a telescope support scientist taking shifts in tandem with an observer. I met two of them. First was Mimi, a science educator, a very nice young lady, full of energy, enthusiastic and talkative; we enjoyed chatting about all kind of things from telescopes, Hawaii myths and music to Trump's tweets. Second was Kevin Silva, a Hawaiian, a calm gentleman, with a long and very interesting experience with the telescope.

The weather at the site was rather good. One distinguishes five grades of weather: very dry, dry, medium, wet and very wet; we oscillated between dry and medium. I made observations using a receiver called SCUBA-2 (a bolometer); once the raw data were ready, I reduced them on the site, it was quite an enjoyable experience.

I felt very much at home at the Observatory. People there were very kind with me. I had a nice room in a three-room guest house, making new friends: Hongjun Ma from the Chinese Purple Observatory and later Peter Scicluna from ASIAA, PI of the nearby evolved stars large project. The director of the EAO, Paul Ho, sent a mail asking whether the telescope was producing good data while I was on top of the mountain. Jessica Dempsey, vice director of the Observatory, warmly welcomed me and tried to encourage Vietnamese astrophysicists to join the community to use the JCMT. Harriet Parson and Mark Rawlings were very friendly and helpful. I spent an evening with friends at Mark's house, playing cards and eating pizzas. A very nice scientific programmer, Bell Graham, kindly took me and Hongjun to Kilauea, the world's most active volcano, a very impressive tour.

On the way back from Hale Pohaku to EAO, I had a nice talk with Marjorie Dougherty, the EAO driver, born in Hawaii but of Japanese descent. She cares very much about the future of the young generation in Asia. I briefly shared with her what we are doing to promote astrophysics and higher education in Vietnam and told her about the difficulties that we have to face. She expressed her sincere hope that “the institute should take better care of you people”, which I found quite moving.

AN INTERVIEW OF DAM THANH SON

On his way back to Chicago from a conference in Quy Nhon, Dam Thanh Son kindly took the time to visit us. Son, who was awarded the prestigious Dirac medal last year, is a theoretical physicist working at the crossroad between non-perturbative QCD, solid state and many body problems such as superconductivity and Quantum Hall effect, superstrings... and more. He listened to us telling him about what we are doing and shared his views with us in a very friendly and open way. He kindly agreed to answer by email some questions that Diep and Tuan Anh had prepared for him.

VATLY: As we told you, we are the only astrophysics group in Vietnam. We are trying our best and doing rather well: we publish in ISI journals, largely alone and mostly as first authors when together with foreign collaborators. The quality of our work is at the level of that of our colleagues in the West. However, we receive very little support from Vietnam; and we meet important difficulties with integrating the international community: our work is often ignored and not cited; some referees refuse to review our papers and we occasionally got very biased and unfair referee reports (in part because being Vietnamese we are supposed to be of low level, more importantly because we are using archival ALMA data of observations that had been proposed by others). Which advice can you give for us to be better recognized both at home and abroad?

Dam Thanh Son: This is the most difficult of your questions. Unfortunately, I cannot give you any practical, ready-made answer. The feeling of discouragement due to the lack of acknowledgment from more established researchers is not foreign to me, and I do see, from time to time, young researchers getting frustrated that the works that they are most proud of do not attract attention of the community. For sure, competitiveness is a feature of our field, and some subfields (perhaps astrophysics belongs to these) can be more competitive than others. On the other hand, throughout my own career, I have seen many cases of utmost generosity, when very

senior and famous physicists were giving credit to young physicists they barely knew. My own advice would be: keep producing high-quality work and excellent students, you will be noticed and recognized.



Dam Thanh Son and the VATLY team

VATLY: We have no financial support for attending schools, conferences, workshops, short courses, visits. On several occasions, we got some kind of support from abroad. However, we sometimes have to pay from our own pocket money to attend such events. Can you comment on such lack of support? How to make our managing and funding authorities understand that support must be given to a young research team to help them progress and succeed? What role could learned societies (Vietnam Physics Society) play in this context?

Dam Thanh Son: Summer schools play a very important role in the education of a physicist. Even the best graduate programs in the US cannot provide a student with all knowledge and skills they will need in their career. At summer schools a student has the opportunity to learn about the most current topics of research, acquaint himself with professors at other institutions and with their peers. I do know that organizers of many schools are aware of the relatively small numbers of Vietnamese students who have the means to attend these schools, and many are trying to help. But generally, often students are expected to cover part of the expenses, especially travel. More advanced researchers certainly understand the importance of going to conferences and workshops. I am not sure how to solve the

problem of the lack of funding for these activities. There must be a concerted effort from the funding agencies to address this question. Another important way to improve the situation is to organize workshops and conferences in Vietnam. This will also require funding. Perhaps private foundations can be convinced to support bringing outstanding foreign scientists to Vietnam for workshops, conferences, or lecture courses.



Dam Thanh Son visiting DAP

VATLY: There is currently a tendency toward giving autonomy to research institutes and universities. How do you see this in the Vietnamese context?

Dam Thanh Son: This is an interesting trend. Unfortunately I am afraid that I am not very well informed about what is going on in Vietnam, in particular I am not sure about the precise meaning of the word "autonomy," when it is discussed. In general, I think Universities would do better when they are given means to improve the quality of faculty and students. They should be able to take important decisions on their own, but also there should be sufficient funding from the Government to do that. The current level of funding for Universities is far from being adequate, I fear.

VATLY: Astronomy is old but Astrophysics is a young and very dynamic field. As an illustration, the number of astrophysicists in the American Physical Society has increased the most in comparison with other fields. The increase is about 25% during the last five years. However, astrophysics is not included in the Vietnamese curriculum. How do you think that we could help with the development of astrophysics research and education in Vietnam?

Dam Thanh Son: In the curriculum of most US Universities one finds courses in topics of astrophysics, e.g., the physics of stars, cosmology, etc., both at the undergraduate and graduate levels. Recently I taught a course called "Introduction to cosmology" to graduate students at the University of Chicago, though cosmology is not my current field of research. I had a great time refreshing my memory, learning new things (which are numerous in such a rapidly developing field as cosmology), and sharing them with students. One of the nicest features of astrophysics is that materials one normally learns in separate courses (like statistical mechanics, quantum mechanics, particle, nuclear, atomic, plasma physics, fluid mechanics...) are often applied to a single physical problem. As I understand, for many years Pierre Darriulat has been advocating for the introduction of astronomy and astrophysics to the curriculum at universities in Vietnam. With a growing number of astrophysicists in Vietnam, I am sure this can be organized. I am pretty surprised that this has not been done widely, as your question implies.

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– PHOTO ALBUM –



Celebrating the end of Judith and Morteza's internship



At the ceremony celebrating 20 years of Odon Vallet fellowships. Odon Vallet is in the middle and his assistant on the right.



After lunch with Paul Ho



Tran Thanh Van having the honour to meet Sonino



On top of Pyla's dune: Stéphane, Diep, Hoai, Anne and Emilie



Tuan Anh on top of Mauna Kea.



Having coffee after lunch with Louis Raymond



Hoai and Phuong on the Dune du Pyla



Signing ceremony between VNSC and Hanoi-Amsterdam High School



Hoai at Nguyen Quang Rieu's place in Paris



Jan Martin and Hoai in Grenoble



Diep, Phuong and Hoai in Bordeaux



*Some of us spent a few days holiday in Angkor.
Khoi and Son are on the right.*



*One of the founding members of the Ho Chi Minh City
Astronomy Amateur Club (HAAC) paid us a visit*



Ngan and her new Torun team