

VATLY NEWSLETTER

*Holdin' on, ten years gone
Ten years gone, holdin' on, ten years gone
Led Zeppelin*

CONTENT

This fourteenth issue of the **VATLY NEWSLETTER** celebrates the tenth anniversary of the creation of VATLY. It proudly dedicates some space to recall what has been achieved. However, at the same time, it gives us an opportunity to bring up the obstacles that are being met, which is done in an editorial by Pierre, recently published in Vietnamese in *Kinh Nghiem The Gioi va Viet Nam, Nha Xuat Ban Tri Thuc, 2011*. The title is **A BIGGER HAMMER**. It is followed by the traditional **NEWS FROM THE LABORATORY** and by a **TEN YEARS REVIEW** of VATLY achievements. Following tradition, we close the issue with a **PHOTO ALBUM**.

EDITORIAL A BIGGER HAMMER

Much of our time and effort are spent in trying to promote scientific training and research of higher quality in the country. The academic environment and the scientific context are not always as helpful as one might hope.

Before coming to Vietnam, eleven years ago, I did not know about ironwood. I was used to birch and spruce. To hammer a nail in such tender woods, you just need to position it well, at right angle, to keep it tight between the thumb and forefinger of your left hand and to hammer it in a single stroke. It is a pleasure to feel it penetrating the fibres. Merciless, a second stroke seals it in for ever. But, in Vietnam, I learned about new species of timber, as hard as steel. To hammer a nail, you need to hit it over and over, you barely see it progress, each stroke brings less than a millimetre, and each stroke is a threat for a twist. In Vietnam, I learned the meaning of the phrase “step by step”.

A few years ago, I had the immense privilege to meet General Giap who had heard that I was acting to help education and training in Vietnam. It was a very moving encounter. He took

my hand in his and told me that Vietnamese universities needed a revolution and that I should keep fighting. I'll never forget it. This is why I agreed to write these few more lines about Vietnamese universities and research in spite of my conviction that everything has been said already, and repeated over and over, and that what we need now are no longer words but action. Let us hope that another stroke will not harm and that the nail will not twist.



General Giap received Pierre in the Autumn 2007

A recent issue of “Vietnamese Studies” starts with two articles on Vietnamese education, one by General Giap and the other by Professor Hoang Tuy. They say all what needs to be said, they have said it for ages, there is nothing to add. But the nail has not moved. We need a bigger hammer.

Recently, I was interviewed by a young journalist. She wanted to meet me because she had heard that I had ideas about improving education in Vietnam. I explained to her that I had no original idea, no idea of my own, that anyone having some experience with higher education and research would say what I say, that it has been said for ages by many Vietnamese who are wiser, more competent and more knowledgeable than I may be, that it is now time to listen to them. There is none so deaf as he that will not hear, none so

blind as he that will not see. We need a bigger hammer.

Indeed, it is easy to identify what needs to be changed, it is not a matter of opinion, it is a matter of common sense and honesty, a matter of intellectual and moral rigour. Let us extract the substance of what General Giap and Professor Hoang Tuy tell us and illustrate it briefly. In a nutshell, what they tell us can be summarized in four sentences: we should stop saying white and doing black; we should restore dignity to intellectuals and scholars; we should have a clear plan for future research and education; we should stop the brain drain.

Vietnamese families spend fortunes to send their children study abroad, Vietnamese universities have become the waiting room for foreign universities. Such money would be much better invested at home by giving universities and research establishments means to improve.

No effort is made to encourage the more brilliant of the Vietnamese students who study abroad to come back home. One should not wait until they get a Fields Medal or a Nobel Prize to recognize their talents. They should be told, before leaving, that the country needs them and that they are its future. They should be told before leaving which plan and which policy have been drawn up in the domain in which they learn, for them to know what they can expect when coming back home. We should follow how well they progress while abroad, they should not feel abandoned by their country but, on the contrary, they should know that their country cares about their progress. When back home, they should receive help to create a team around them and to make as efficient as possible a use of the talents and skills that they have acquired abroad.

We should have a clear policy in matters of higher education and research. Such policy should be broadly advertised and made known for all of us to act in accordance with the guidelines that it implies. Today, most good students study economy. Economy is the science of making money with money. Are we sure that Vietnam needs so many economists? Aren't there more precious talents that need to be developed? This reminds me of a tale I was once told about. It happened in a tiny Asian kingdom that has disappeared since long. The aristocracy and the

king's court were living in opulence and had developed very refined manners while the peasants were poor, rough and uncultured. Aristocrats were eating their rice on tables made of precious wood, with silver chopsticks and golden bowls, while peasants were eating it on ground, in banana leaves and with their fingers. The unbalance, and the injustice that it implied, became so blatant that a revolution broke out, the king and his court were killed and the peasants took over. They wanted for their children the happy life of which they had been deprived; they wanted them to learn the refined manners that were current in the king's court; they enrolled their children in new schools where such manners were being taught. They were so successful that the new generation became soon expert in refined and sophisticated manners; they knew precisely how to hold their chopsticks and how to lay them on the table depending on circumstances. Soon, however, the citizens of the new republic were no longer able to grow rice, no longer able to cook it, and they all promptly died of starvation in a terrible famine.

It has been said that twenty thousand new PhDs will be trained by 2020. It took me ten years to train three PhDs. Where should we find the five or so thousand professors that will take the time to guide and supervise so many students? Claiming to be able to take such a challenge deserves some explanation on how it should be done. In December 2009, a student of mine defended her PhD thesis in a prestigious French university. She was brilliant and got excellent appraisal from the panel. The thesis was under a joint supervision agreement that had been signed beforehand between Vietnam and France: it described how to proceed with the thesis in a way that is fair to both countries and stated that the student would share her time between Vietnam and France and get her degree from both countries. She got her French degree since long but she still has not received the Vietnamese degree because of difficulties with stupid and obsolete rules that were probably making sense in the fifties but that have become completely improper in today's scientific world. Naively, I had thought that the Vietnamese university should have been happy and proud to have a PhD thesis in joint supervision with one of the

most prestigious European universities. Such was not the case. The Rector, a friend whom I highly respect, did his best to solve the problem but even he, at the top of the hierarchy, was unable to change rules that have become completely inadequate in the contemporary context. Rules are made to be respected when they make sense and to be changed when they no longer do. But even a rector has not enough freedom to change things to the better. Then who can? How can we hope to have a Vietnamese university in the top 200 by 2020, as officially advertised, if we are not even able to take care of such trivial flaws?

Today, a young student who just completed her studies in the Hanoi University of Economy will usually find a job where she earns more money than a university professor. Something must be wrong. Not with what she earns, which is well deserved, but with the wages given to university professors. The consequences are catastrophic. First, to the professor, it is like a slap in the face, it is like telling him that the country does not need him, does not care about what he does. How could we expect that he should care about his students and their future when he is treated with so little dignity? Second, such wages are not sufficient to feed his family; he needs a second job to live decently. How could we expect that he could be a good professor or do good research if he can only spend part of his time on such demanding tasks and responsibilities? Of course, the Government has no magic stick that could allow a sudden increase, by a factor of five or so, of the wages of the academic staff and of other civil servants in similar conditions. Restructuring and early retirement plans have to be elaborated, positions have to be open to young postdocs, a new “habilitation” degree, as exists in many foreign countries, has to be created in order to better identify what is required to belong to the academic staff.

One more point on morality. Whoever loves science is sensitive to its ethical content. Intellectual rigour goes hand in hand with moral rigour. In science, cheating is committing suicide. Sooner or later, the fraud is unveiled, remember Lyssenko. Recently, Vietnamese university professors were caught as being guilty of plagiarism: they had simply copied articles by other authors and had submitted them to famous

scientific journals where they have been published. They were also claiming to have invented a new method of analysis of quasar spectra, which was simply a succession of mistakes and misconceptions, in fact these professors had no knowledge of astrophysics. As Hoang Tuy says, *“At school, we teach our children frankness and uprightness; we, adults, must show the example.”* There is too much corruption, too much cheating, too much falsehood in the world around us, we must keep these out of our universities. We must stop giving marks between 9 and 10 to ignorant students, we must prevent cheating in exams, we must restore the values that diplomas are meant to represent. Whether we like it or not, we have now become citizens of the world, Internet erases borders, countries can no longer hide facts from their nationals. We should stop teaching untruth to our children and students, they are no longer dupes and the only result is that they will not believe us when we teach them the truth.

It is time to stop. What I wanted to say, General Giap and Professor Hoang Tuy have said it much better in their articles. Why should I repeat it? There is just one thing more personal that I should like to say. For now eleven years, I have lived in Vietnam and devoted much of my time to my Vietnamese students. Whatever I say is with my heart, because I care for them, because I wish their country to offer them the future they deserve having. I know well the recent history of Vietnam and the sorrow it has suffered, so unjustly, and for so many years. Anyone who knows it, cannot refrain from falling in love with the country and wishing for it a happier fortune in the years to come. I know how strongly the past sixty years have marked three generations of Vietnamese, how deep the wounds are in spite of appearances and how broad the gap between these generations. Such knowledge can only inspire humility and respect, and prevent me from making judgements or expressing criticisms. But I firmly believe that it is now time to react and to give a chance to the new generation to take part with enthusiasm in the intellectual renaissance of the country by giving a strong boost to higher education and to research. They have not known the colonial oppression, they have not known the wars, they have not known the difficult after-war

years, they are the children of Doi Moi. The bigger hammer that Vietnam needs is in their hands. Let us not miss this opportunity and let us do our utmost to give them encouragement, help and support.

NEWS FROM THE LABORATORY

Under this heading we review briefly the progress of the work of the team and the main events in its life.



Dong, Pierre Desesquelles, Tiina Suomijärvi, Nguyen Mau Chung, Pierre, Pierre Billoir and Nguyen Anh Ky after Dong's PhD thesis defence

The end of last year saw the defence of two PhD theses and two master theses, Diep and Dong for the former, Tuan Anh and The for the latter. During this period, Nhung was in Malargüe where she took part in shifts and in the Collaboration Meeting.

Diep's and Dong's theses were presented in Orsay, within two days of each other, in their respective laboratories, Institut de Physique Nucléaire for Dong and Laboratoire de l'Accélérateur Linéaire for Diep. The juries included, in addition to the thesis supervisors, Pierre Billoir, Nguyen Mau Chung and Nguyen Anh Ky. It was an opportunity for many who had been associated with the theses to see each other again in a friendly context and, for us, to warmly thank the host laboratories and, in particular, Tiina Suomijärvi, Alain Cordier, Marcel Urban and Isabelle Lhenry-Yvon who had taken essential parts in the supervision and support of Diep and Dong. Both got a mention "très honorable". After

the defence, Dong went to Grenoble where he spent a few days with the Auger group, under Dy-Holm Koang, learning about their contribution to the study of what is called, in the Pierre Auger Observatory jargon, "raining PMTs". These are photomultiplier tubes of the surface detector that experience instabilities under conditions of sudden temperature changes, a dysfunction for which the Grenoble team had found a cure but which is not completely understood. Diep had come to France with his wife, Dung, and they took a few days of holiday after the thesis and visited Alsace.



Pierre, Diep, Pierre Billoir, Dung (Diep's wife) and Nguyen Mau Chung after Diep's PhD thesis defence

Tuan Anh had defended his master thesis just before the publication of Newsletter 13, where the event was reported. The defended her brilliantly just after and, like Tuan Anh, she got the highest mark.



The and Nguyen Mau Chung after her thesis defence

Her study of Diffusive Shock Acceleration, using a toy Monte Carlo model, had the advantage and originality to provide a simple picture of effects that are rather difficult to visualize. In particular, in contrast with standard much more serious studies, but also much less transparent, her model made it clear that magnetic field turbulences are an essential ingredient and that some scale coherence was necessary between the Larmor radius and such turbulences. The married just after and we had the pleasure to invite her for lunch together with her husband. We wish the young couple happiness and success. She is now teaching physics in a Hanoi high school.



Just married: The and Hoi

Tuan Anh's and The's master theses made the subjects of two articles that have been submitted, and now accepted, for publication in Communications in Physics (Vietnam).

A sad event occurred before Christmas. Two Vietnamese professors, together with some of their students, were convicted of fraud and plagiarism. In addition to sully the reputation of Vietnamese physics and to throw shame on all of us, it revealed an alarming lack of protection against such misconducts. What had happened was that these people had copied from published papers on a very interesting topic: the possibility that the fine structure constant be changing with time and that such changes could be detected in the spectra of high redshift quasars. These people,

who have no knowledge of astrophysics and very little of experimental physics, claimed to have invented a new method of analysis summarized in eight kindergarten equations of which only one was free of mistakes. Unfortunately, the Vietnamese physics community and academic hierarchy proved unable to control such a scandal and, still today, some of the published articles have not yet been withdrawn.



The fresco in the main auditorium

At about the same time, a happy event occurred, which made us forget the former: Vietnam National University awarded the title of Doctor Honoris Causa to Nguyen Quang Rieu, a Vietnamese radio astronomer who made his scientific career in France, trained several Vietnamese students in the field and spent time and effort to promote teaching and training of astrophysics in Vietnam. Together with him was Pierre Encrenaz, a famous French astronomer who is actively supporting several actions aimed at helping Vietnam in its progress. The ceremony took place in the main auditorium of the original Hanoi University, which today hosts Chemistry students. The room is decorated with an allegoric fresco depicting Knowledge radiating on the people of Vietnam, in the style of the 1920's. The author is the French painter Victor Tardieu who created, together with Nam Son, a very talented Vietnamese painter, the first Vietnamese University of Fine Arts. Victor Tardieu was a warm friend of Vietnam and of its culture, nothing to do with a colonist exploiting the people, but Nam Son suffered of this "collaboration" and is not recognized in today's Vietnam as he deserves being.

Rieu and Pierre Encrenaz, dressed with red gowns well in tune with the solemnity of the place, said some nice and kind words expressing their

friendly support to Vietnamese science. The event was followed by a series of talks and lectures, including a fascinating account by Pierre Encrenaz of the recent mission on the largest of Jupiter's moon, Titan. It was for us an opportunity to meet two younger astrophysicists, Alain Maestrini and Pierre Lesaffre, both having close connections with Vietnam, and to establish with them relations which, we hope, will last long.



Nguyen Quang Rieu receiving his Honoris Causa degree from the hands of the Vice President of Vietnam National University

Alain gave lectures on the instrumental aspects of millimetre astronomy and Pierre on Supernovae.

The following week was dedicated to the annual meeting of the Vietnam Physical Society (VPS), which was held in Hanoi University of Technology. VATLY contributed three presentations and one poster. The presentations were by Diep on the nature of primary ultra-high energy cosmic rays, by Thao on an overall report of VATLY's research and by Hiep on Global Warming and Cosmic Rays. The poster was by Tuan Anh on solar radio interferences at 610 MHz. Antonio Insolia, from Catania, was invited to give an overall account of Auger results. We were very happy to have a chance to meet him again after several years, and we invited him for dinner in a restaurant downtown.

Nguyen Quang Rieu attended the meeting. His presence was an occasion for his former students and for all of us in Vietnam having interest in astrophysics, to meet and join effort, under his authority and encouragements, in a new

“Astrophysics group”. In addition to VATLY, the group brings together Dinh Van Trung, a radio astronomer who recently returned to Hanoi after several years in Taiwan where he worked on molecular spectroscopy and its applications to interstellar matter, red giants, etc.; Phan Bao Ngoc, a younger colleague of his, who has expertise on brown dwarfs, and has now returned to Vietnam where he teaches astrophysics in Ho Chi Minh City; Dao Tien Khoa, our colleague in INST and nuclear theorist with interests in nuclear astrophysics, in particular in the structure of neutron stars; Nguyen Quynh Lan, who has a PhD in field theory, teaches astronomy at the Hanoi University of Education, and collaborates with Grant Matthews on a model attempting to account for both dark energy and dark matter in a single picture; Tran The Trung, who got his PhD from France on planetary atmospheres and is now brilliantly leading the FPT Technology Research Institute in Hanoi, with a keen interest on space science and satellites; and Pham Anh Tuan, from the satellite department of the Vietnam Academy of Sciences, who will be the Head of a future Vietnamese Space Centre. The mere existence of the group is already a step forward; a school of physics organized in Ho Chi Minh City in the last week of November 2011 with IAU support will soon be an occasion for us to get closer together.



Hiep addressing the VPS audience on Global Warming and Cosmic Rays.

For the time being, we have established a web site, <http://ftri.fpt.edu.vn/apg/announce.php> maintained by Tran The Trung, which eases communication between us. We have plans to

organize joint seminars, but this has not started yet. Several prestigious foreign scientists and, in Viet Nam, Nguyen Van Hieu, have expressed their moral support by joining as associate members.



Hoai in the GRAPES-3 array at Ooty

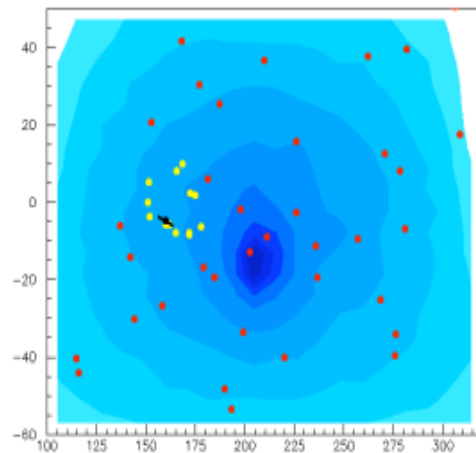
Just before Christmas, Hoai, who has now become an expert in the physics of shower development, joined the Corsika school (Corsika is the name of a sophisticated software designed to accommodate shower simulation codes for cosmic ray physics). The school, which lasted one week, was held in Ooty, up in the mountains of southern India (2'200 m), where Tata Institute operates, in collaboration with Japan, a small ground array named GRAPES-3. She was the only lady among some twenty male students and she represented her gender with brilliance. A visit to the GRAPES-3 array had been organized. Hoai had a hard time to get used to Indian food but assimilated very well the subtleties of shower simulations.



Nhung and Auger friends after the Collaboration "asado" in Malargüe

Nhung returned to Hanoi after Christmas following a fruitful stay in Malargüe; the results that she presented to the Collaboration had been well received and she had spent useful time in taking shifts and helping with the array maintenance, in particular with the monitoring of surface detector photomultiplier tubes. She could stop in Paris on her way to Argentina and spend a few days with Pierre Billoir in her PhD laboratory at Jussieu.

New year, new tasks... Nhung and Dong embarked into a study of "raining PMTs", using data collected at high rate following a suggestion of Pierre Billoir, which turned out to be very instructive and successful. The results were presented in a GAP note that was published in April. Then, Nhung got interested in studying where UHECR showers are pointing back to; in particular, the region of Cen A, the closest AGN to the Earth, was explored in detail as were showers pointing to nowhere (there exist large regions in the sky accessible to cosmic rays, the so-called voids, which are devoid of galaxies).



Sky map in supergalactic coordinates showing the PAO acceptance (blue), UHECR showers having no correlation with AGNs (red), and showers pointing within 18° of Cen A (yellow). The Cen A radio jets are shown in black.

Diep and Dong started working on Amiga data; Amiga is an array of muon detectors that is currently being installed on the Pierre Auger Observatory site with the aim to better understand the nature of the primaries. It is part of a broader initiative consisting in equipping part of the site with a higher density of surface detectors. Thao

upgraded the VATLY Cherenkov electronics to include an accurate measurement of the time autocorrelation spectrum and assembled a scintillator detector to compare its autocorrelation response to that of the Cherenkov detector. She is presently completing a data collection period of nearly three months, varying the detection threshold and the delay of the time window. The analysis of these data will enable her to tell apart the two main components of the autocorrelation time distribution: electrons from the decay of stopping muons and multiparticles from a same shower. Hoai, under Diep's guidance, is now seeing the end of the pharaonic enterprise which will become her master thesis in the Autumn, and which consists in developing a shower simulation code that keeps transparency and flexibility up to the highest UHECR energies. Each new step has been a source of surprises and the amount of work invested in this code is enormous, as is the experience that has been gained.

What has marked the New Year most, however, is the new investment of VATLY in radio astronomy. It started before Têt with an 18-day visit of Alain Maestrini, who gave us very nice lectures on radio detection, in particular in the millimetre range. These proved extremely useful in giving us solid bases and introducing us to the most advanced methods and technology. We found in Alain a wholehearted friend, committed to helping us growing with full strength. He managed to obtain for us, from the Paris Observatory where he is working, very high quality instruments, which we would otherwise have been unable to acquire: a spectrum analyser and a wave generator, not to mention additional useful equipment. This was sent free of charge thanks to the help of Roger Eychenne, from the French Embassy, who made it possible for us to use the diplomatic pouch.

In early April, we received the Small Radio Telescope (SRT) that we had ordered from Boston. It includes a 2.6 m diameter dish equipped for detection of the 21 cm hydrogen line (1.42 GHz) with a 40 MHz bandwidth. It came by plane in the form of a kit and Alain Maestrini came back to Hanoi on this occasion, spending a week with us to assemble it.

The telescope was put together in record time and we have been taking data for now more

than two months. A first systematic study of the background has demonstrated very good qualities in terms of stability and accuracy. Hiep and Tuan Anh have reported the results in an internal VATLY note.



Alain and Dong watching Hiep and Nhung at work

Hiep will make his master thesis on SRT data. The main topics that will be addressed next are the observation of the Milky Way disk, in particular Sgr A*, and of the Sun. The former, using the 21 cm line, will give information on the rotation of the Galaxy and the need for dark matter. The latter, on the continuum, will reveal activity of the recently awakened Sun that came out of a long period of quietness. After having completed the SRT assembly with a TV camera and a lightening rod, Hiep is now installing a system allowing for a more accurate measurement of the direction, elevation and azimuth, to which the SRT is pointing.



Installing the dish of the SRT on the VATLY roof

Now that we have the SRT, we returned the 610 MHz Yagi interferometer with which Tuan Anh had made his Master thesis, and which he had made work and upgraded, to the Hanoi University of Education where we had unearthed it from. We hope very much that it will now be used for training students and possibly attract some of the most brilliant to astrophysics.

In September, Tuan Anh will start a PhD thesis under joint supervision with University Paul Sabatier in Toulouse, having Frederic Boone as supervisor. Frederic and Pierre met in Paris and all conditions seem to be realized for a very profitable, friendly and successful collaboration. Tuan Anh will work on the analysis of millimetre data, a subject in which Frederic's expertise is internationally recognized. Doing imaging with an interferometer array is not a simple task. It resembles more X-ray diffraction by crystals than traditional astronomy in the visible. Angular resolution of a single dish is insufficient to do imaging on small pixels in the focal plane; the role of pixels is played by the many possible pairs of antennas in the array; a kind of Fourier transformation of the measured signals must be performed to obtain an image in celestial coordinates. In Hanoi, using a PowerPoint set of lectures by Frederic, we introduced ourselves to this new topic. Tuan Anh, in parallel with its getting familiar with the SRT, is preparing himself to his new life in Toulouse. He will spend there the four last months of each of the years 2011 to 2013. His thesis will be shared between data analysis methods using data from Plateau de Bure, an interferometer array in the French Alps operated jointly by France, Germany and Spain, and data, real and/or simulated, from ALMA, a giant array under construction in Chile. In addition, he will study a gravitationally lensed far-away galaxy, with a redshift of ~ 2 , which has been observed using the Plateau de Bure array. Analysis of its molecular spectrum, in particular of CO lines, should provide interesting information on the early Universe.

Tuan Anh also spent three weeks in an astrophysics school in Li Jiang, a small and beautiful mountain town in South China, only 850 km away from Hanoi. The school was organized by IAU and he met there two VATLY friends, Ed Guinan and Michele Gerbaldi. Tuan Anh was

appreciated as being a very active and diligent student and made many new friends. The school visited the 2.4 m optical telescope and Tuan Anh spent two full nights making observations there.



Tuan Anh, Ed Guinan, Rishi, Jean-Pierre and Michele Gerbaldi at the Li Jiang school

Between January and June, a young physics student in her fourth university year, Nguyen Thi Dung, spent part of her time with us and worked on her dissertation. The subject was Gravitational Lensing and Einstein Rings. We introduced her to the elements of relativity that are necessary to calculate the bending of light in a gravity field and she wrote a computer code with which she could trace light rays. She showed how light may curl around a black hole and simulated Einstein rings, giving evidence for the amplification effect and showing how the ring gets distorted and finally fades away when the source-lens-observer alignment deteriorates. She obtained the highest mark and may now study for her master in theoretical physics at the Institute of Physics.

Nhung and Diep were each awarded a special Odon Vallet fellowship for young researchers, which they received on Christmas Eve on the occasion of the closing ceremony of VSOP16, the Vietnam School of Physics that had taken place in the Institute of Physics and had specialized on condensed matter physics.

In October last year, Khoa was awarded the very prestigious "Nhan Tai Dat Viet" Prize; This prize, "for Vietnamese talents", is awarded yearly to a few Vietnamese teams or individuals working in information technology, in medicine or in natural sciences, whom the country is proud of.

VATLY and, for that matter, the whole Institute, congratulated him warmly and felt very proud of the recognition given to his talent.



Khoa addressing the audience after having received his Prize

In May, Pierre gave a series of lectures to first year students of the newly created USTH, the University for Sciences and Technology of Hanoi. This is a new Vietnamese university, created with French support. It is part of an ambitious programme initiated by the Government and aiming at establishing four universities with foreign support (the other three are with Germany in Ho Chi Minh City, with Japan in Da Nang and with the United States in Can Tho). These universities are supposed to join the club of the world 200 best universities by 2020. Whether they will be able to achieve this goal or not is a matter of controversy among Vietnamese scholars, who do not see clearly which particular asset they enjoy that might allow them to do better than the others.

The Government imposed on USTH to start functioning in October 2010, on the occasion of the millennium of Hanoi to which the slogan 10-10-10 had been attached, but this was a premature start making it difficult to recruit outstanding students. We, in VATLY, are in principle prepared to contribute to the success of USTH within the limits of our possibilities. But we have not yet been able to establish strong relations. In particular, the hope we once had to have Tuan Anh's cotutelle under USTH support could not concretize. Roger Eychenne, who is doing his utmost from the French Embassy for the success of USTH, and Pierre Sebban, the French

co-rector, helped us out by finding ways to support the expenses that will be incurred by Tuan Anh during his stay abroad, including paying for the plane tickets. Pierre Encrenaz and Alain Maestrini, from France, are also prepared to contribute to the development of USTH and the equipment that Alain gave us could be used in part to train USTH students.

Pierre's lectures were an introduction to modern physics: the idea was to explain to the students how a retina cell and a neurone work, what a scanning tunnelling microscope is, how a nuclear reactor works, etc, hopefully awaking their scientific curiosity. Hiep took part in the course, which was given in English, and stayed with the students at the end of each lecture to summarize what had been said and answer questions in Vietnamese. This was a very useful initiative and the students were apparently demonstrating a strong interest. However, the examination, which took place several weeks after the end of the course, was rather disappointing.

Pierre also started a new series of lectures in VATLY on introductions to particle physics and to cosmology. They will continue until the end of the Autumn.



Dong holding the VAEC flag on which the Minister is pinning the medal

The Vietnam Atomic Energy Commission, from which our Institute depends, celebrated its 35th anniversary this April and the Institute its 30th anniversary. In fact, INST in its present form was established later, in 1990. On this occasion, VAEC was awarded the very prestigious Labour Medal, which the Minister pinned on the flag that

Dong was proudly holding. Moreover, Dong sang with a male choir a famous ballade about Hô Chí Minh and won the chess contest. Thao, beautifully dressed as a butterfly, performed in a graceful ballet celebrating Spring and Diep arrived second in the badminton competition. On June 1st, on the occasion of Children Day, the Institute was open to families and we enjoyed the visit of Diep's son, Khoi, who showed much interest in what we were doing. Thao spent time with the children, making them play, draw and sing.



Khoi and ông Pierre

Recently, we enjoyed the visit of a few friends, including Patrick Aurenche, Tran Ngoc Tiem, Sally Seidel and Nguyen Xuan Han.

Patrick came in relation with the signature of the LIA (Laboratoire International Associé) agreement between the French CNRS and Vietnam. Thanks to this agreement, Nhung and Diep will be able to attend the Pierre Auger Collaboration meeting in November in Malargüe and to spend a few days in their PhD Parisian laboratories. In principle, CNRS covers particle and astroparticle physics as well as astrophysics, the former via IN2P3 (Institut National de Physique des Particules et de Physique Nucléaire) and the latter via INSU (Institut National des Sciences de l'Univers); however the present LIA agreement is much closer from IN2P3 than from INSU and we shall have to learn how to get also some formal support from the astrophysics side (we already got much informal support from our astrophysics friends).

Tiem, who had visited us last year (see Newsletter 13) is now back in Vietnam and

working with the Institute of Physics.

Sally Seidel, a physics professor at the University of New Mexico, Albuquerque, and a physicist working on CDF and ATLAS, came to Vietnam and gave lectures on quantum mechanics, which Hiep attended. She is a Vietnam Education Foundation (VEF) Fellow, VEF being an “independent federal agency created by the U.S. Congress and funded annually by the U.S. Government with mission to strengthen the U.S.-Vietnam bilateral relationship through educational exchanges in science and technology”. She gave a seminar on beauty mesons at the Institute and we invited her for lunch. We enjoyed very much discussing with her and exchanging our experiences; unfortunately she was leaving the day after.



On VATLY roof: Hiep, Sally Seidel, Dong and Pierre

Finally, Nguyen Xuan Han is a former theoretical physicist who once came to CERN and worked with Gabriele Veneziano. Back in Vietnam, he gave physics lectures at the Hanoi University of Sciences and focussed on matters of general education. We had been intending to meet him since long, and the occasion was recently given to us when he was appointed referee for Dung's dissertation. We invited him for lunch. As he is a member of an advisory governmental committee on education chaired by the Prime Minister, we explained to him the obstacles that we are meeting in the hope that he could remember our message when attending the Committee meetings.

Two more words, briefly, one on Nafosted and one on Tia Sang.

This year is the first when we receive financial support from the Vietnamese funding agency, NAFOSTED. We did not get as much as we hoped for and we will try to get more next time. We have not yet learned all the tricks, which the others know...

Tia Sang is a semi-monthly magazine published by the Ministry of Science and Technology with which we maintain friendly relationships. It is open to constructive opinions on education and research and generally does not suffer censorship. It serves as a forum for Vietnamese scholars having interest in the scientific development of the country. We contributed many articles, most of which are signed by Pierre, written by him in English and translated into Vietnamese by Diep and Nhung. Recently, there was a very interesting exchange of views, after the Fukushima incident, on whether it was reasonable for Vietnam to have decided to enter the nuclear club. The fear that Vietnam would be insufficiently prepared triggers much concern among scientists. Yet, China and India are going ahead with very ambitious nuclear programmes and it seems quite natural for Vietnam to join the club: its needs in energy are growing very fast while it is currently consuming, per inhabitant, a good order of magnitude less electricity than western countries.

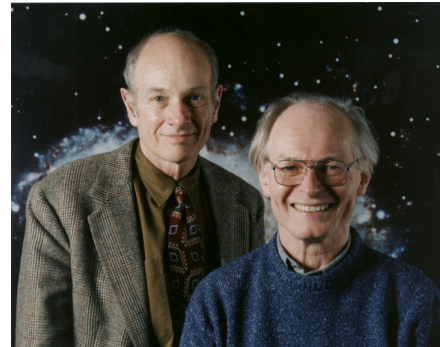
A TEN YEARS REVIEW OF VATLY'S ACHIEVEMENTS

The best way to summarize VATLY achievements is simply to list the PhD theses, master theses and dissertations that it has produced over the past ten years, each time commenting briefly on what they contain. This is what the present section is aiming at. However, a few lines of introduction are necessary in order to recall how it all started and to set up the framework within which VATLY operates.

The early days

The founding fathers of VATLY are Jim Cronin and Alan Watson, as initiators and genitors of the Pierre Auger Observatory, Tran Thanh Van and Nguyen Van Hieu, as their interlocutors on the Vietnam side and Vo Van Thuan as director of INST. Jim and Alan were deeply aware of the role

that the PAO might play in helping the development of science in emerging countries.



Jim Cronin and Alan Watson

Concretely, they had established contacts with UNESCO in order to get support for encouraging such moves. Vietnam was an obvious candidate and Tran Thanh Van the natural contact. Nguyen Van Hieu, who was at the time at the head of Vietnamese science, welcomed the idea of a collaboration and Vo Van Thuan, at the time at the head of INST, accepted to be the host. However, as no one had experience with cosmic ray physics in particular and with large experimental physics collaborations in general, not much went on for several months. INST had been given the task, in collaboration with Collège de France, to produce some electronics cards of a design that got rejected by the Collaboration soon afterwards. It was not a very encouraging start.



Thuan and Dinh in front of the VATLY Cherenkov detector



The early VATLY team in front of the muon telescope with which we measured the atmospheric flux in Hanoi: Dinh, Diep, Pierre, Thao, Nhung and Thieu

When Pierre decided to come to Vietnam, he knew of Auger and its UNESCO connection from Jim Cronin, with whom he had maintained friendly relationships for the past 35 years or so. Being close to Tran Thanh Van, who is famous in the west for his role in federating scientists in *Rencontres* of various kinds and in particular in Vietnam, he asked him for his advice and help. The connection was immediately established and Pierre arrived in Hanoi at the end of 1999, following a few preparatory short stays, with a ton of scientific equipment that he had received as gifts from colleagues at CERN. These included scintillators from the CHARM neutrino experiment, photomultipliers of various sizes and NIM and CAMAC electronics units, which were still in working order but considered obsolete by their owners as having been superseded by more modern designs. Pierre, with his experience of large collaborations, knew of the danger of the INST staff being used as cheap labour and did not wish to take new commitments in electronics. He concentrated instead on setting up a scintillator detector with which to measure the flux of atmospheric muons in Hanoi. His idea was simply to train future students and to make them familiar with the Pierre Auger instrumentation and methods. Unexpectedly, the measurement turned out to be of particular interest to the Japanese Nobel Prize winning underground neutrino experiment, SuperKamiokande, which needed to map the neutrino flux impinging on Earth, of which the muon flux is a good indicator. As Hanoi

happens to be in a region of the Earth where the rigidity cut-off (the effect of the geomagnetic field on the trajectory of charged particles) is maximal and where such measurements were scarce, our measurements gained unexpected value. They produced three publications in Nuclear Physics and, more importantly, attracted Diep and Nhung, who were at the time in their fourth university year and became the first nucleus of the VATLY team, soon followed by Dong and Thao.



VATLY Inauguration day: Thieu, Phuong, Pierre, Dung and Dinh.

The assembly of the detector and data acquisition, and the very first measurements, had been made by two young students working with Pierre, Pham Ngoc Dinh and Pham Trung Phuong. Dinh did not wish to stay in Vietnam and left for the United States while Phuong, who had been trained as an electronic engineer, set up a small private company of his own. The laboratory was inaugurated on May 16th 2001.

Xin Cam On!

VATLY could not have survived without the support of their many friends. It is here the place to thank them wholeheartedly.

First, the Pierre Auger Collaboration, and in particular its French component who act as our tutors in the Collaboration and with whom we established PhD thesis joint supervision agreements: Antoine Letessier-Selvon, Pierre Billoir, Alain Cordier, Marcel Urban, Tiina Suomijärvi and Isabelle Lhenry-Yvon; Auger did not only give us a name but sets the frame within which we organize our research. We owe a lot to

Jim Cronin and Alan Watson who inspired the spirit of cooperation and support to developing countries which impregnates the Collaboration and of which we benefit so much: may they find here the expression of our deepest gratitude.



Pierre and Jim in Ha Long bay in August 2007

Second, we thank those who, in Vietnam, support our action. Our host Institute, INST, has always demonstrated a most friendly attitude toward us and provided all the logistic support it could afford to give in spite of the fact that our research is not really in line with its main mission. For this support, we thank its successive Directors, in particular Vo Van Thuan and Trinh Van Giap, and our friend and colleague Dao Tien Khoa. Vietnamese Universities are not really in a position to support or manage scientific research; they lack the tools and experience; while Pierre is an invited professor in Hanoi University of Sciences, this did not open for him any door that might have allowed for new initiatives, whether in training or in research; this was soon realized and we turned to the Vietnam Academy of Science and its Institute of Physics to find an atmosphere more open to scientific research and more favourable to our progress. We express our deep gratitude to Nguyen Van Hieu and the successive Directors of the Institute, Nguyen Ai Viet and Nguyen Dai Hung, for their constant help and support.

VATLY receives financial support from several sources, without which we would simply disappear. Among our supporters are our official funding sources in Vietnam, INST and Nafosted, of which we gratefully acknowledge the support. Very important, moreover, are the World Laboratory, the

Rencontres du Vietnam and the French CNRS. Here is the place to thank them warmly. The Worldlab fellowships are a vital support to the Laboratory and we are deeply touched by the confidence that Antonino Zichichi is placing in us; we do our best to deserve it; it is a strong moral support when those who help us trust that we try hard to make the best possible use of their support.



Antonino Zichichi, founding father of the Ettore Majorana Centre for Scientific Culture in Erice and President of the World Federation of Scientists



Tran Thanh Van after having awarded an Odon Vallet fellowship to Hoai, Thao and Tuan Anh

We thank warmly Tran Thanh Van and Odon Vallet for the support given in the general framework of Rencontres du Vietnam and Patrick Aurenche for that provided by the French CNRS, in particular IN2P3. Recently, our decision to divert part of our effort to radio astronomy has implied a need for new financial resources from a new part of the scientific scene in which we are not much known; we found there many friends

who gave us not only a strong moral support but also much financial and material assistance, in particular Nguyen Quang Rieu, Pierre Encrenaz, Alain Maestrini, Pierre Lesaffre, Michele Gerbaldi and Edward Guinan; we thank them most warmly.

What next?

The main VATLY achievement is to have built a research team. Unfortunately, this is not appreciated in Vietnam as much as it should. There is very little experience of this kind in the Vietnamese physics community. When a physicist trained abroad comes back to the country, he often receives neither encouragement nor support to build a team around him. On the contrary an old-fashion attitude prevails, favouring individualism and depreciating teamwork. As a result, most physicists returning to the country keep doing research in relation with their former foreign collaborators but are not given a chance to build something new in Vietnam. The very few who succeeded doing it had to fight an environment that is not favourable to modern scientific research. It will take a change of culture to progress in this domain. If VATLY may be proud of what has been achieved on its very local scale, it failed miserably in its efforts of having an influence on the scientific environment. The best future we may wish for VATLY is to soon become the seed, or at least one of the seeds, of an Astrophysics Institute of which Vietnam could be proud. Let us hope that this will happen before we celebrate our twentieth anniversary.

Dissertations

1. Pham Thi Tuyet Nhung, *Dependence of the Cosmic Ray Flux on Atmospheric Temperature*, 2003,

2. Pham Ngoc Diep, *Dependence of the Cosmic Ray Flux on Atmospheric Pressure*, 2003

Evidence for correlations between the flux of atmospheric muons in Hanoi (sea level) and the atmospheric pressure and temperature is found in the VATLY data. It amounts to $-0.15\%/mbar$ as expected from the associated variation of the quantity of matter traversed by the developing shower. The dependence on temperature, $-0.06\%/^{\circ}$, results from the very strong correlation that links temperature and pressure.

3. Dinh Lam Anh Huyen, *Thoi Gian Song Cua Muon*, 2004

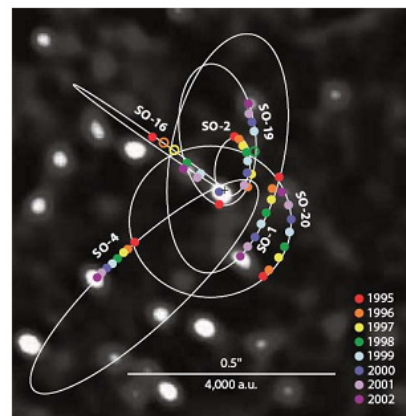
The dissertation studies how to measure the muon lifetime in the VATLY Cherenkov detector and gives the results of some early measurements.

4. Nguyen Viet Phuong, *A Simple Model of Longitudinal Development of Electromagnetic Showers*, 2006

A Monte Carlo study of the longitudinal development of electromagnetic showers, neglecting any other interaction than bremsstrahlung and pair creation and any other constituent than electrons, positrons and photons, gives evidence for its scaling properties and allows for a simple parameterization.

5. Kim Thi Phuong, *The Black Hole in the Centre of the Milky Way*, 2006

The observational evidence for the presence of a 3 million solar masses black hole, Sgr A*, in the centre of the Milky Way is reviewed. It includes essentially observations in radio, infrared and X-rays.



Stars orbiting Sgr A, the black hole in the centre of the Milky Way*

6. Doan Thi The, *Optical Properties of a Cherenkov Counter*, 2007

A simple Monte Carlo simulation of the optical properties of the water Cherenkov counters in use in the Pierre Auger Observatory, a replica of which is in operation at VATLY, has been made with particular emphasis on the relation between the asymmetry of the three PMT

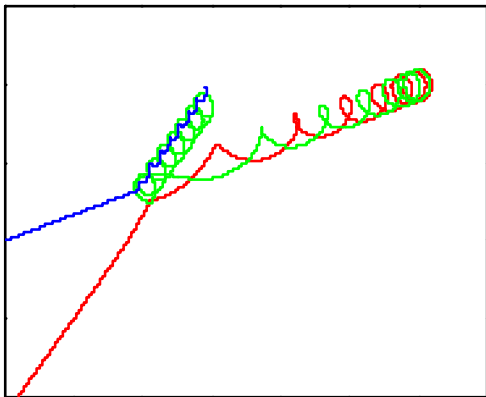
responses and the direction of incidence of the particle on the detector.

7. Le Thi Huong, *Galaxy Collisions as Possible Sources of Ultra High Energy Cosmic Rays*, 2008

The properties of Cen A, a strong radio source associated with the closest AGN to Earth, in the centre of an elliptical galaxy having collided with a smaller spiral, are reviewed. Particular attention is given to those features that would favour diffusive shock acceleration of cosmic rays on large shocks.

8. Do Thi Hoai, *X-ray Binaries and Three-body Capture*, 2009

A Monte Carlo simulation of the capture of a member of a binary by a heavy object passing by gives evidence for the chaotic nature of the three body problem and for the high cross-section for formation of X-ray binaries in dense environments such as the centre of the Milky Way.



Capture of the green member of a red-green binary coming from the right by a blue massive star coming from the left and producing a blue-green X-ray active binary.

9. Lion Alio, *Extensive Air Showers and the LPM Effect*, 2009

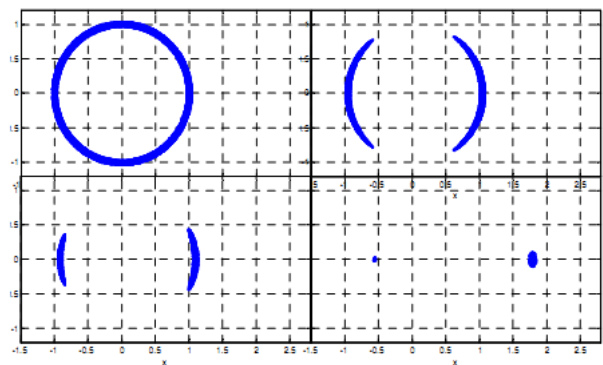
The simple shower model developed at VATLY is used to study the consequences of the Landau-Pomeranchuk-Migdal effect on the development of ultra high energy showers.

10. Nguyen Van Hiep, *Global Warming and Cosmic Rays*, 2010

Arguments in favour of an influence of cosmic rays on global warming are reviewed. Such an influence would proceed via the cloud formation rate being modulated by the variations of the cosmic ray flux on Earth, itself modulated by the variations of the rigidity cut-off induced by changes in the interplanetary magnetic field, itself modulated by changes in the solar activity.

11. Nguyen Thi Dung, *Gravitational Lensing and Einstein Rings*, 2011

The bending of light rays in a gravity field is calculated and illustrated by tracing light rays curling around a black hole. Einstein rings are produced for different alignment of the source-lens-observer system; the amount of amplification and the ring distortion are studied as a function of the quality of the alignment.



Einstein rings fading away as the source-lens-Earth alignment deteriorates.

Master theses

1. Nguyen Hai Duong, *Nghien Cuu Bat Doi Xung Thong Luong Muon Tai Hanoi*, 2003

The east-west asymmetry of the atmospheric muon flux in Hanoi is measured and monitored over several days with the help of a six-scintillator hodoscope. The result, $16.3 \pm 0.8\%$, is in agreement with expectation.

2. Pham Thi Tuyet Nhung, *Performance Studies of Water Cherenkov Counters*, 2006

The response of the VATLY Cherenkov detector to relativistic muons is studied using two scintillator hodoscopes that help defining the muon trajectories. Evidence for the

proportionality of the signal to track length in water is presented.

3. Pham Ngoc Diep, *Detection and Study of Ultra High Energy Cosmic Rays*, 2006

A Monte Carlo simulation of the observation of extensive air showers using the fluorescence and surface detectors of the Pierre Auger Observatory is used to identify the main features of relevance to the angle and energy measurements.

4. Pham Ngoc Dong, *The Cherenkov Counters of the VATLY Laboratory*, 2006

A major refurbishing of the VATLY Cherenkov detector, including better water filtering, recoating of the tank walls and installation of new photomultiplier tubes, is described. First results are presented. In addition, the design, installation and running-in of a set of three satellite Cherenkov counters aimed at providing a shower trigger are described.



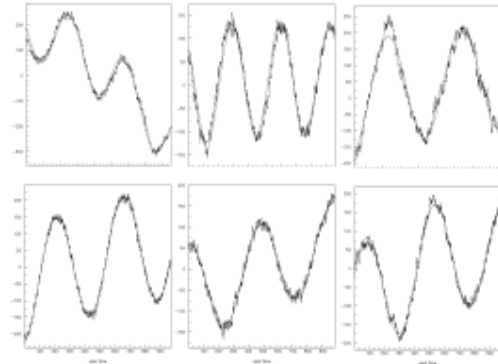
Refurbishing the VATLY Cherenkov detector: Pierre and Dong

5. Nguyen Thi Thao, *The Detection of Extensive Air Showers in Hanoi*, 2007

The response of the VATLY Cherenkov detector to a trigger made of a coincidence of three smaller Cherenkov counters surrounding it is studied. It provides information on the energy of the extensive air showers that produce the trigger.

6. Pham Tuan Anh, *Interferometry of the Sun Emission at 610 MHz*, 2010

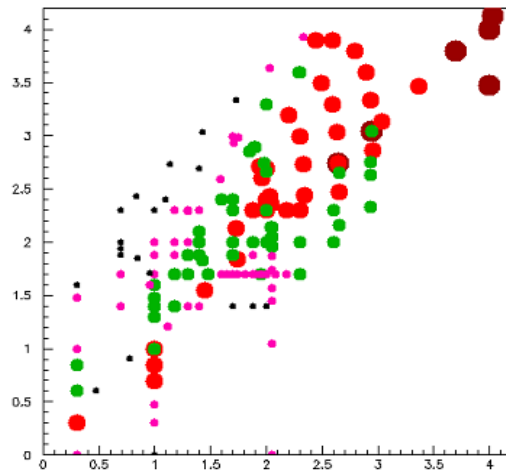
A two-Yagi-antenna interferometer operated at 610 MHz on a 20 m base is used to observe the solar signal, its modulation and to measure its power density.



Solar interferences at 610 MHz.

7. Doan Thi The, *A study of Diffusive Shock Acceleration*, 2010

A Monte Carlo simulation of diffusive shock acceleration is used to give evidence for the need of magnetic field perturbations of dimensions commensurable with the Larmor radius of the cosmic rays being accelerated. The main features of the acceleration mechanism are illustrated.



Evidence for correlation between the scale of magnetic field perturbations and the Larmor radius in diffusive shock acceleration.

8. Do Thi Hoai, *An Original Method of Simulation of the Development of Extensive Air Showers in the Ultra High Energy Domain*, 2011.

A Monte Carlo simulation programme has been written, based on parameterizations of the longitudinal and transverse shower developments, which allows for a transparent and flexible study of UHECR shower properties up to the highest possible energies.

PhD theses

1. Dang Quang Thieu, *Thi Nghiem Do Phan Bo Goc Thong Luong Muon Khi Quyen Tai Ha Noi*, 2007

The thesis specializes on instrumentation and electronics and makes use of early VATLY measurements of the flux of atmospheric muons in Hanoi.

2. Pham Thi Tuyet Nhung, *Contribution to the Study of Ultra High Energy Showers Using the Surface Detector of the Pierre Auger Observatory*, 2009

Features displayed by the Surface Detector data of the Pierre Auger Observatory are described and studied. They include a detailed evaluation of the uncertainties, the development and assessment of a peak finding algorithm, a study of the signal produced by decay electrons from stopping muons and an analysis of the asymmetry between the responses of the three

PMTs of a same detector and its relation with the direction of incidence of the impinging particles.

3. Pham Ngoc Diep, *Contribution to the Identification of Primary Ultra High Energy Cosmic Rays Using the Pierre Auger Observatory*, 2010

The relative muon density on ground is used to infer the iron to proton ratio of primary ultra high energy cosmic rays detected by the Pierre Auger Observatory. An energy independent analysis gives evidence for a mismatch between observations and predictions. The analysis, applied to the Cen A region, suggests a strong proton component at variance with the general energy trend.

4. Pham Ngoc Dong, *Contribution to the Study of the Response to Cherenkov Photons of a Large Diameter Photomultiplier Tube and of its Use in the Pierre Auger Observatory*, 2010

A detailed study of the response of the photomultiplier tubes of the Pierre Auger Observatory Surface Detector gives evidence for a significant dependence of their response on the location of the photon impact. A simple model accounting for some transparency of the first dynode describes it well. Various dysfunctions of the phototubes in operation in the field are studied in detail and explained.



Diep - 2003



Nhung-2003



Huyen - 2004



V. Phuong 2006



K. Phuong 2006

Bachelors



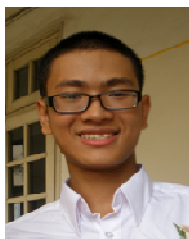
Dung - 2011



Hiep - 2010



Hoai - 2009



Lion - 2009



Huong - 2008



The - 2007



Nhung - 2006



Dong - 2006



The - 2010



Diep - 2006



Thao - 2007



Duong - 2003



T. Anh 2010

Masters



Thieu - 2009



Nhung - 2009



Dong - 2010



Diep - 2010

Doctors

Distribution: Patrick Aurenche, Jim Beatty, Cristoforo Benvenuti, Jean Pierre Bibring, Pierre Billoir, Frederic Boone, Murat Boratav, Bui Duy Cam, Ludwik Celnikier, Ngo Bao Chau, Nguyen Duc Chien, Doan Minh Chung, Bach Thanh Cong, Alain Cordier, Jim W. Cronin, Nguyen Nhu Dat, Manoel Dialinas, François Le Diberder, Luigi Di Lella, John Ellis, Pierre Encrenaz, Alberto Etchegoyen, Roger Eychenne, Jerome Friedmann, Daniel Froidevaux, Yoshitaka Fujita, Karel Gaemers, Michèle Gerbaldi, Nguyen Van Giai, Edward Guinan, Jacques Haïssinski, John Hearnshaw, Pham Duy Hien, Nguyen Van Hieu, Morihiro Honda, Le Van Hong, Pham Quoc Hung, Nguyen Dai Hung, Antonio Insolia, Stavros Katsanevas, Dao Tien Khoa, Marc Lachièze-Rey, Nguyen Quynh Lan, Nguyen Van Lien, Grant Mathews, Giorgio Matthiae, Peter Mazur, Phan Bao Ngoc, Etienne Parizot, Michel Pedoussaut, Denis Perret-Gallix, Minh Ha Pham-Delègue, Tran Viet Phuong, Joël Pouthas, Philippe Quentin, Burton Richter, Nguyen Quang Rieu, Jean-Michel Rieubland, Jonathan L. Rosner, Carlo Rubbia, Shin'ya Sawada, Pierre Sebban, Sally Seidel, Greg Snow, Paul Sommers, Phan Hong Son, Michel Spiro, Jack Steinberger, Marilena Streit-Bianchi, Tiina Suomijarvi, Christine Sutton, Annick Suzor-Weiner, Tran Minh Tam, Dick Taylor, Samuel C.C. Ting, Tran The Trung, Dinh Van Trung, Hiroshi Tsunemi, Pham Anh Tuan, Hoang Tuy, Marcel Urban, Odon Vallet, Jean Tran Thanh Van, Suzy Vascotto, Sylvie Vauclair, Tini Veltman, Nguyen Ai Viet, Alan Watson, Achim W. Weidemann, Joël Weisberg, Atsushi Yoshida, Antonino Zichichi.

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<http://www.inst.gov.vn/Vatly/Vatly.htm>

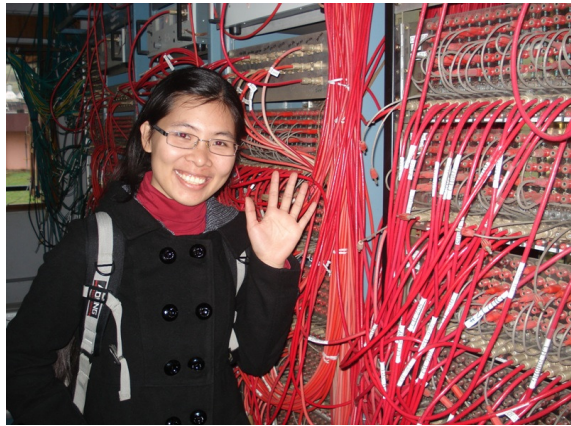
- PHOTO ALBUM -



Diep's PhD thesis: Diep, Nguyen Anh Ky, Marcel Urban, Pierre, Nguyen Mau Chung, Alain Cordier, Pierre Billoir and François Couchot



After Diep's PhD thesis defence: Loc, Mai, Diep, Pierre Lesaffre and Dong



Hoai in the GRAPES-3 control room



Hoai and schoolmates in Ooty



Khoa surrounded by family and INST friends at the Prize ceremony



Vice President Nguyen Thi Doan, Panel Chair Nguyen Van Hieu and Dao Tien Khoa



Antonio Insolia presenting Auger results at the VPS meeting



Li Jiang from a surrounding hill



Installing the SRT : Dong, Diep, Alain and Thao



Installation of the SRT : Diep, Dong and INST friends giving a hand



VAEC anniversary celebration ballet. Thao is at the centre of the front row; on the rear row, Diep is second, Nhung fifth, Hoai sixth and Dong seventh.



Dong at the VAEC chess tournament



Tuan Anh (top centre) and friends in Li Jiang



Tuan Anh and schoolmates in Li Jiang



Diep and Dung in Colmar



Thao's dance



Nhung and Khoi on Children's Day



The VATLY gang celebrating Diep's birthday