

VATLY NEWSLETTER

"In the cultural, scientific and technological domains, money has become the end goal rather than the means as it should be. This may be the reason for our society to be in such a bad state and so backward: scholars have difficulty to find positions in which they might play their role in promoting progress."

Pr. Phạm Duy Hiên

VATLY WISHES TO ALL THEIR FRIENDS



A VERY HAPPY NEW YEAR OF THE SNAKE

CONTENT

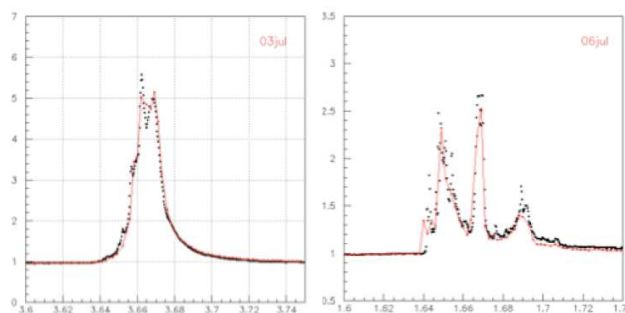
This seventeenth issue of the **VATLY NEWSLETTER** opens with the traditional **NEWS FROM THE LABORATORY**. **THAO, TUAN ANH** and **HOAI** report on their stays abroad. **HIEP** sent us a few lines from Saigon. Diep and Nhung have interviewed **Pr. PHAM DUY HIEN**. Pierre wrote a few lines about **A PELLETRON AT HUS**. Following tradition, we close the issue with a **PHOTO ALBUM**.

NEWS FROM THE LABORATORY

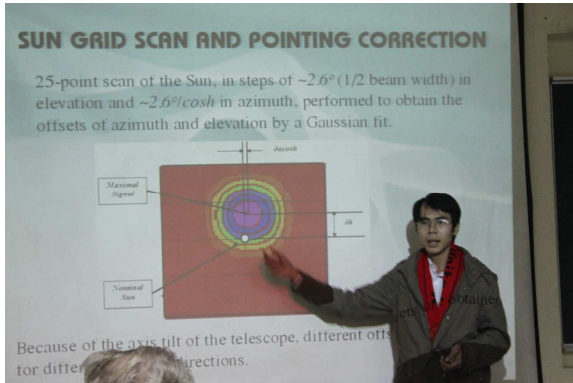
Under this heading we review briefly the progress of the work of the team and the main events in its life.

The past six months have witnessed a continued drift of the team activities from cosmic ray physics to radio astronomy. We discussed the issue with Antoine Letessier-Selvon, our godfather and link to the Pierre Auger

Collaboration, and it was decided that we would stay in the Collaboration until the end of its present phase, in 2015. In particular, Nhung worked full time with Hoai, Tuan Anh and Hiep on astrophysics topics and gave lectures at the Hanoi University of Sciences on an Introduction to Astrophysics and Cosmology that were highly appreciated by the students. Hiep completed his master thesis which he defended successfully in December at the Institute of Physics.



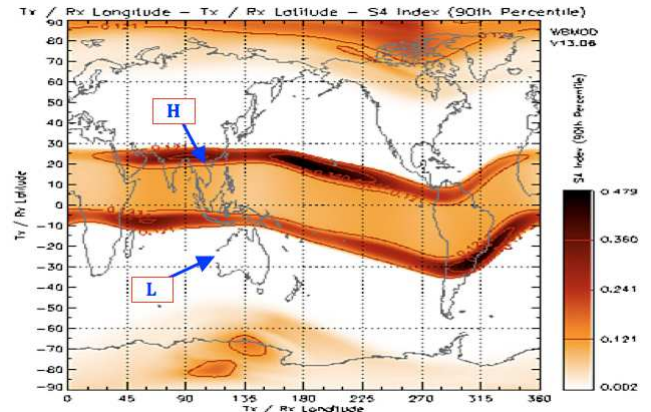
Two solar flares detected at VATLY (black) and Learmonth (red) on July 3rd and 6th respectively.



Hiep presenting his master thesis

In addition to the mapping of atomic hydrogen in the disk of the Galaxy, he included the observation of thirty solar flares obtained from solar data collected on-the-flight during the second half of the year. A comparison of our data with data obtained by the Australian Learmonth Observatory at similar longitude as ours and the same frequency (just below the 21 cm line) turned out to be very interesting. In particular, both sets of data include oscillations with amplitudes at the percent level and periods in the 5 to 7 minutes range. While positively correlated, they display significant differences that are not well understood. Possible hints are different polarisation states (we measure circular, Learmonth measures linear) and possible ionospheric effects. Indeed, for the same geomagnetic reason that causes the rigidity cut-off to be maximal in Hanoi, the activation of the ionosphere by solar winds is also maximal in Hanoi while it is normal in Learmonth. This peculiar situation, which is a nuisance for radio transmission, in particular of satellite signals, may be a chance for us to be exploited as was done earlier with the measurement of the atmospheric muon flux. We have summarized our observations in an internal note that we have sent to solar oscillation experts in the hope to get comments and guidance.

Hiep's master thesis work produced a paper that has now been submitted for publication in Communications in Physics (Vietnam). Unfortunately, Hiep does not stay with us for a PhD but moves to the South where he will start a new life. We will very much miss him. We had a team dinner to bid him farewell and to wish him happiness and success.



Distribution of the ionospheric S4 index showing Hanoi (H) and Learmonth (L) locations.

In November, Hiep and Nhung attended a conference in Palawan (Philippines) where they both presented results of the group (Hiep on the HI mapping and Nhung on gravitational lensing). Thao went to a conference in Malaysia in November where she gave a talk on VATLY research activities. Such contacts are very welcome. Together with those already established by Tuan Anh with Thailand and Indonesia, they make our presence on the scene of South-East Asia more visible and contribute to the liveliness of a network of friendly relations among the young astronomers and astrophysicists of the region.



Hiep and colleagues in the conference room in Palawan.

Thao has now completed the writing of her PhD thesis and will defend it in June. She has started a series of presentations that are required for her to get her degree: on Auger results, on LHC detectors, etc. This is to comply with a new regulation that has been imposed by the Ministry of Education following a number of frauds in the

award of PhD degrees (such as people buying at very high price theses written by professional counterfeiters – better to say copied and pasted from earlier published work; such cheating is apparently not uncommon). Rather than chasing the cheats, the Ministry preferred to establish stricter rules and increase the bureaucratic entropy, probably because they do not trust the thesis directors...

Thao and Hoai were awarded a special research fellowship by the Odon Vallet Foundation, which they received from the hands of Nguyen Anh Ky on behalf of Rencontres du Vietnam at the Institute of Physics. Dong represented Hoai, who was in Paris at that time.

Before leaving for their four month stays in France, in the framework of the “cotutelle” agreements established with Toulouse University and Observatoire de Paris, Hoai and Tuan Anh worked hard to produce draft articles summarizing the work they had done: Hoai on the gravitational lensing of extended sources and the subtleties it implies in the neighbouring of the lens caustic; Tuan Anh on the analysis of sky maps of the host galaxy of a large redshift ($z=2.8$) gravitationally lensed quasar (RXJ0911), both on the CO(7-6) line and in the continuum beneath it. Hoai’s paper has now been submitted for publication in Research in Astronomy and Astrophysics. While Tuan Anh devoted his time in Toulouse to the pursuit of his work, this time in the Fourier plane rather than on the dirty map, Hoai moved to a completely new topic under the supervision of Thibaut Le Bertre: the study of the mass loss of RS Cnc, a red giant in the thermally pulsing phase of the Asymptotic Giant Branch. They report about their stays elsewhere in the present issue. Both took advantage of their presence in France to attend the IRAM school on radio interferometry that was held in Grenoble in October.

In addition to their analysis work on Auger AMIGA data, Diep and Dong took a more active part in the life of the Institute and attended some of their meetings. In particular, Dong was elected representative of the young scientists’ staff. Both took over from Hiep the necessary know-how for the operation of the radio telescope and the exploitation of its data. Diep is now analysing solar data that were collected on the 21 cm line. Both Diep and Dong are associated with the lab

work of the master “Space and Applications” of the USTH University which they prepared on the occasion of a visit to Hanoi of Alain Mæstrini. Dong spent a full week there taking part in the lab work sessions together with Damien Prêle. Nhung will contribute to classes related with the passage of particles through matter.

Two fourth year undergraduate students, Cuc and Phuong, just joined us. They will work on their graduation dissertation under the guidance of Diep, with help from Dong and Thao. They will study photomultiplier tube signals produced by the traversal of cosmic muons in a stack of scintillators.

Dong is pursuing the construction of a small cloud chamber in his spare time.



Hoai and Tuan Anh in La Bastille in Grenoble

The team gave a major contribution to the assembly of a book, written in Vietnamese and entitled *The Search for the Higgs Boson, A Fascinating Scientific Adventure*. The idea originated from a few Vietnamese scholars with whom Pierre was in contact; as he was himself much closer to the subject and more knowledgeable about it than they were, he felt that his duty was to help them by collecting relevant papers and have them translated into Vietnamese. The main sources were an article by Michel Della Negra, Peter Jenni, and Tejinder Virdee, a book edited by Lyn Evans entitled *The Large Hadron Collider: a Marvel of Technology* and articles in the CERN Courier. The hope is that telling this story to the young generation of Vietnamese would set a good example of determination, of creativity, of team spirit, of international collaboration, of dedication to science and to

knowledge and of intellectual and moral rigour, all virtues that are necessary conditions for Vietnamese science to progress. Nhung and Diep translated large parts and checked, corrected and edited the other translations, a major amount of work.

Another positive contribution to Vietnamese science was to initiate a series of measures meant at improving the level of the domestic publication *Communications in Physics (Vietnam)*. The whole refereeing system was revised with the aim to improve its quality and to significantly shorten the time it takes. A result of this initiative has been that Nhung accepted to assist the Editorial Staff in their work.

Pierre presented a report to the Hanoi University of Sciences aimed at giving advice on how to optimize the use of a Van de Graaff accelerator (3.4 MeV protons) that they acquired in 2011 and that is very much underused; more is said about it elsewhere in the present issue.

Pierre presented his report on the use of our Worldlab fellowships in Erice in August. We learned soon after that Professor Antonino Zichichi has been appointed Minister of Culture of the autonomous region of Sicily: we share his pride and wish him much success in this important function.

Pierre presented a request for financial support to the International Astronomer Union (IAU) to invite the thesis co-directors of Tuan Anh and Hoai to spend a week in Hanoi and give us some lectures. Françoise Combes, an internationally renowned astrophysicist with expertise in the field of galaxy dynamics and formation, kindly accepted to join them. Unfortunately the request, although being judged of high quality, was put on a wish list and Pierre is now seeking other sources of funding; he decided, however, that the visit will anyhow take place, even if funds have to be taken from private sources.

Tran Thanh Van came to Hanoi as part of a tour aimed at preparing the inauguration of the Quy Nhon International Centre for Interdisciplinary Science and Education that he has created. Diep will help with the organisation of the event as a member of the local organizing committee. An astrophysics school will precede the inauguration: Diep will give a series of

lectures on cosmic ray physics.

On October 1st, Vinatom, the Vietnam Atomic Energy Commission of which our Institute is part, organised a conference for their younger staff to present their work. Hiep presented his work using the radio telescope and won the first Prize; Thao presented part of her thesis work and won the third prize. We are very proud of them.



Thao (second from left) receiving her award at the Vinatom young staff meeting

The end of the year saw the usual lot of meetings at the Institute and elsewhere; on this occasion, VATLY was awarded a prize from Vinatom and Diep received a special prize from the Ministry of Sciences and Technology.

Finally, two happy events are to be reported under our “People” column: Hoai’s wedding and Dong’s son birth. On the 16th day of the twelfth month of the year of the Dragon, Hoai married Tran Bac Son, whom she had first met at the VSOP school of Physics in Dong Hoi in 2009. Pham Thanh Nam, a strong and beautiful baby, was born on December 3rd. We wish them all tons of happiness.

A WEEK IN MALAYSIA

Thao reports below on her attending a conference in Malaysia.

Last November, I had a memorable time while attending a Malaysian national physics conference organized by Universiti Kebangsaan Malaysia (UKM) and Malaysian Institute of Physics. The participants came from a variety of universities in Malaysia including Universiti Malaya, Universiti Teknologi Mara, Universiti

Sains Malaysia, etc. Most of them are young and working at frontier fields of physics such as astrophysics, particle physics and interdisciplinary physics. In particular, there exists a very active astronomy group at Universiti Malaya; they used a small Ritchey-Chretien telescope to detect H- α lines in seven M-type red giants; they have a strong radio astronomy team that used 7 m single dish Jodrell Bank data to measure the mass of neutral hydrogen in the galaxy cluster A262; as members of the Callisto network of solar radio spectrometers, they detected solar flares over long periods of time to study radio bursts; they have a small radio telescope at the lab and are now installing a larger 7 m dish: Dr. Zamri Bin Zainal Abidin, the team leader, after having learned about the existence of our radio telescope suggested exchanging students and researchers between VATLY and his group as well as possibly collaborating in the future.



Thao and her Malaysian friends in a shopping mall in Kuala Lumpur.

On this occasion, I visited Universiti Malaya and UKM. Universiti Malaya is the oldest university in Malaysia, located in the heart of Kuala Lumpur, it is quite modern and open minded. UKM is located in a large college town, 40 minutes away by train from the capital. I went there on a Friday, a day devoted to prayer (Juma'ah Salat): boys pray the whole morning, prayers echo all over the place on campus. Meanwhile, girls are resting and shopping and enjoy their free time. UKM hosts mostly Muslim students: I met there very few students of Indian or Chinese origin while they were many of them at the Conference. There are many cultures,

religions and languages cohabiting in Malaysia, resulting in a large number of private schools, where such languages are taught in addition to English, which is compulsory from primary school onward. In universities, English is used exclusively.

Jaafar Jantan, a professor at the University of Technology of Malaysia who had been awarded a Prize for Excellence in Teaching in 2011, gave a very interesting talk on how to improve the teaching of physics at universities. I had lunch with him and he gave me useful advice about finding the right balance between research and teaching.

I was the only foreigner attending the conference. I presented some results from my thesis work that will appear in the proceedings. As they will be published by the American Physical Society under an agreement between UKM and the American Institute of Physics, this will satisfy one of the conditions necessary to defend my thesis. It would be a good idea if a similar arrangement could be established in Vietnam.

While in Kuala Lumpur, I stayed in the home of my friends, Khoo Eng Yow and Chin Jee Yin; I had first met them in Vietnam six years ago, where they were backpacking; they are married now and have a very cute little boy. They invited me to Indian, Chinese and Malaysian restaurants. I learned a lot by listening to them talking about education, religion and the diversity of cultures in Malaysia. I thank them wholeheartedly for their warm hospitality.

BACK IN TOULOUSE

Tuan Anh reports below about his second stay in Toulouse.

The end of last year saw my second stay in Toulouse, at the Institut de Recherche en Astrophysique et Planétologie (IRAP), in the framework of my PhD thesis. With the help of Frédéric, I pursued the analysis of the RXJ0911 quasar data from the Plateau de Bure Interferometer; this time, I worked in the Fourier plane where the interferometer measures directly a quantity called visibility, related to the sky brightness distribution. This avoids artefacts that

have their origin in the imaging and deconvolution processes and allows for dealing more rigorously with noise. We wrote a code to fit an image in the Fourier plane, which turned out to be very efficient, flexible, and quite general. As a result, the paper that had been drafted earlier could now be finalized and is currently being circulated among the co-authors.

During my stay, together with Hoai, I enjoyed attending a week of lectures in Grenoble. This is a yearly school organized by the Institut de Radioastronomie Millimétrique (IRAM), even years in Grenoble on interferometry and odd years in Andalucia on single dish observations. The school was excellent but one week only is a bit too short. We had lectures by world class experts in the field of millimetre astronomy.

In Toulouse, IRAP hosts a club for PhD students learning about Galaxies, High energy astrophysics and Cosmology (GAHEC), which I joined; it is organized by two senior astrophysicists, Nicolas Bouche and Nathalie Webb. In this context, we attended a training course on how to best present our work. We met every second week, each of us in turn presenting a topic of his choice behind closed-door in front of a video camera. The video tapes were then analyzed by the group members. In a first phase, we did not discuss about astrophysics but were free to choose other topics. I took this opportunity to introduce them to Vietnamese food, culture and music in a five minute talk.

I made a new friend, Louka, Frederic's son, a very cute little boy. When we first met, he wanted to tell me something: he ran to his father, whispered it in his ear, and then came back to me and said it in English. He guided me on a tour to his room and showed me a lot of things. Because of my ignorance of French, I could just watch him and listen to the music of his voice, trying to guess how much he will have grown the next time we meet.

Some weekends, I walked along Canal du Midi, which is very close to the laboratory, and had dinner downtown. Ruka Misawa, a Japanese PhD student in the lab, also likes it. At lunch, she taught me Japanese words concerning food and impressed me by her ability to learn fast how to read and write Vietnamese. I like dry Japanese tofu as much as she likes phở. But she is not the

only one trying to learn Vietnamese: Jean Louis, an old man with whom I use to talk at lunch time, also tries. He always starts a conversation with me with a “chao” and ends it with a “mai gap”, meaning “hello” and “see you tomorrow” in Vietnamese. These two words make up nearly half of his Vietnamese vocabulary; but never mind, I like to talk with him all the same, and to hear his views on today's science.

At IRAP, by chance, I met an old Thai friend, a member of the Southeast Asian Young Astronomers Collaboration (SEAYAC), Siramas. She came to the institute for one week as a visiting scholar. I had first met her in Ayutthaya, an ancient Thai capital 60 km north of Bangkok, when I went there to report on the work done with the VATLY radio telescope. I convinced her to have dinner in a small Vietnamese restaurant. Like Ruka, she loved phở from the first try and enjoyed it even more with a pinch of spicy chili. We chatted a lot about what we were doing; then, we went to the Christmas market, which opens at the beginning of December in the main square of the town.

A memorable event during my stay was the opportunity to take part in the detection of the CO(8-7) molecular line using the 30 m IRAM radio telescope on Pico Veleta in Andalucia. Frederic and I observed remotely a sub-millimetre galaxy at a redshift of ~ 5 , it took nearly five hours of observation. It was such an exciting experience! I wish I'll have some more like it during my scientific life.

AUTUMN IN PARIS

Hoai spent the first four months of her PhD stay at the Paris Observatory. She reports here about it.

This year, I started my first PhD year by spending four months in Paris, September to December. This is in accordance with a cotutelle agreement between the doctoral schools of the Observatoire de Paris and of the Hanoi Institute of Physics: I am supposed to spend four months in Paris in each of the three years of my PhD studies under supervision of Dr Thibaut Le Bertre and the rest of the time in Hanoi with Pierre. The subject of my work had been decided nearly one year ago:

it is related to the study of Red Giants at radio wavelengths and the mechanism that governs their mass loss. However, before leaving for Paris, I had spent most of my time helping Tuan Anh with gravitational lensing, and there had not been much time left for me to get prepared: it is only when I arrived in Paris that I really started working on the subject.

Paris is a beautiful city, especially at night. I was very surprised to find Paris much quieter than Hanoi. I enjoyed walking along the Seine River; I passed by groups of young people playing music and dancing; I strolled along the beautiful Notre Dame or the Eiffel Tower; I visited the Louvre and Orsay Museums.

As I do not speak French, it was not easy for me to adapt to my new life. But Thibaut helped me a lot. He and his wife picked me up at the airport and drove me to my friend's place. He took me to CROUS and to the Campus to help me with the accommodation. He also helped me completing the administrative formalities and introduced me to everybody in the lab with whom he is working. He encouraged me to take a two week French course that turned out to be very useful. Thank to him everything became easier and he lightened my being away from home.

During these four months in Paris, I learned a lot, not only about physics but also about the history and culture of France. I also feel much more confident now. Thibaut is a very good teacher and adviser. I may discuss with him whenever I wish. He always listens to me, explains very slowly and carefully what he knows, gives me good advice and useful references.

During my stay in France, I attended the IRAM school in Grenoble, which they hold each year alternating with Granada, on interferometry and single dish observation respectively. Indeed, IRAM operates the Plateau de Bure Interferometer in the French Alps and the 30 m antenna at Pico Veleta is located in a mountain in Andalucia near Granada. It was for me an occasion to meet many radio astronomy experts. With Tuan Anh, who also attended the school, and Lisseth, my roommate, we took the time to explore this beautiful city. Thank to the introduction of Thibaut, I contacted with an expert of IRAM, Jan Martin Winters, who helped me a lot with the analysis of the data. I could show him a

preliminary report on my work concerning the simulation of CO line emission from RS Cnc (a red giant on the AGB) and he gave me useful comments and suggestions.

In November, Thibaut organized a conference on Betelgeuse in Paris that I could attend and where I had a chance to meet many experts in the field: Betelgeuse is a Super Giant that has many properties close to those of the sources that I am studying. Therefore this conference was very useful for me. Time had been reserved for a visit of the exhibit room of the Paris Observatory and for trying to use the old telescope on the roof of the main building. It was an amazing experience!



Hoai and Michele in the gardens of Versailles castle.

I am very fortunate to spend my PhD time in Paris. Not only because Paris is famous and beautiful, with a long history, but also because I could meet there many close friends of VATLY: Michele Gerbaldi, Nguyen Quang Rieu, Alain Maestrini, Pierre Lesaffre, Pierre Encrenaz ... They helped me a lot during my stay and I never felt lonely. Michele took me to Versailles just after I had arrived and downtown Paris in the Christmas lights before I left. She is an excellent tour guide: thank to her I learned a lot about French history. I met Nguyen Quang Rieu quite often in the lab. He is very knowledgeable about what I study and he gave me a lot of good advice. Before coming back to Vietnam, I visited him at his home. We had a long discussion about science in Vietnam and he gave me strong encouragements.

LETTER FROM HIEP

Dear Bac and Anh Chi,

First of all, I would like to wish you a Happy New Year of the Snake, good health, happiness and success.

Three years of study and work at VATLY will remain wonderful and unforgettable days in my life. I very much enjoyed working there; what I learned and the experience I gained in making my graduate dissertation and my master thesis under your guidance has helped me in feeling more confident in my new job and in my new life. I thank you for your support and encouragement during these three years.

The first day at VATLY, four years ago, is so fresh in my memory that it seems to have happened yesterday. My last year at the university was extremely busy; I had to share my time between a part-time job and preparing for the graduation exams. To have a good graduation thesis was very crucial. I had been suggested to apply to VATLY by my teacher and by a friend who was one-year ahead of me at the university. Thus, on September 3rd, the day following Vietnamese National Day, I borrowed a bicycle from my dormitory and headed toward the Institute for Nuclear Science and Technology (INST) where VATLY is located. I remember the ten kilometres that separate the dorm from the lab, mentally rehearsing in my mind the few English sentences which I ought to say on this first meeting: nothing around me existed; I just kept cycling like a programmed robot.

I stopped in front of a large gate, a three-story mossy building, probably built many years ago. My heart was beating hard, I was quite nervous. I walked through the path for bicycles and motorcycles. The attendant in the gatehouse asked me where I was going. – To meet Pr Darriulat, my new thesis advisor, I said. She gave me a ticket for the parking of the bicycle and told me to walk up to the third floor. I went up, the first room had “Prof. Pierre Darriulat” written on the door, I knew I was at the right place. I took a deep breath before knocking on the door, a voice from inside said “Come in, please!” and the door opened wide on a rather large room with a row of computers on the left, a bookshelf on the right and a board on the wall. They were three in the room,

a white-haired European whom I identified as Bac Pierre, a young lady with whom he was working and another young man who had opened the door for me. I tried to introduce myself in English and to explain what was taking me there, but my English was rather poor: without the help of the young colleagues, I could not have made me understood, nor could I have understood what Bac Pierre was telling me, namely that he accepted to guide me for my graduation thesis. I was expecting to be given material to work on, but he told me that he would send it by email, that the subject of my work would be on global warming and a possible influence of cosmic rays. Then, my new young colleagues kindly took me around the laboratory and made me meet some other members of the team. I will never forget these moments, the memory of being in VATLY for the first time. Soon after I graduated, I was fortunate to become officially a member of VATLY doing research in Astrophysics, my favourite major.



Farewell dinner for Hiep

VATLY is a really sweet and serious workplace, with a supervisor who taught me the meaning of science, and whose deep knowledge and experience was always keeping us on the right track. His patience and support helped me overcome many crises in the completion of my thesis work. I will never forget the period when I had to work out the pointing corrections for our new radio telescope. It took us a long time to realize that in addition to trivial offsets of the azimuth and elevation scales, we also had to account for the fact that the support pole of the telescope was not exactly vertical. Alone, I do not know how I could have solved the problem.

My colleagues in VATLY have been incredibly kind and friendly to me. Their constant support and advice, the many discussions we had, helped me greatly to improve my knowledge in the field. They were always ready to help with the successful completion of my work. Indeed, we were working with a real passion for science, working is having fun and having fun is working. I will remember all my life such a privileged relationship with excellent friends, colleagues and mentors. Besides hard working days, we also shared a lot of memorable moments. We visited Sapa, enjoyed the pure fresh air of the North-West forest, discovered mysterious cultures, or wandered as clouds around the West Lake in the purple sunset. And so many more, I could not describe all of them, it would take too long, my fingers would get tired.

I have been really fortunate to have been working in VATLY. It gave me opportunities to travel to many places all over the world, for schools and conferences, to learn about new countries and to make new friends. Moreover, during these three years, I met many famous scientists who visited our laboratory. I am not sure what the future will bring but I am sure that the knowledge gained during my time in VATLY will help me to face it with much more confidence. For all this, once again, let me express my sincere gratitude and best wishes to Bac Pierre and all of my colleagues, wishing you all happiness, health and success in both your professional and private life. I hope that you will all achieve what you need to make you happy. I wish you good luck in the future. On my side, even though I will miss you, I am looking forward to take the challenge of facing a new phase of my life.

INTERVIEW OF Pr PHAM DUY HIEN

Professor Pham Duy Hien is a former director of the Da Lat reactor Centre and played a major role in the development of Nuclear physics in Vietnam. He is a respected figure of the Vietnamese research and education sectors and his views and advice are always taken with much interest by the deciders in the Government. Diep and Nhung interviewed him for the VATLY Newsletter.

VATLY: How do you feel about us, astrophysicists, working in an Institute for Nuclear Science and Technology?

Hien: Science is multidisciplinary. Your knowledge and understanding of astrophysics, as well as the techniques and methods that you make use of, can be applied to other fields. Astrophysics is not that far away from the general research direction of the institute. Electromagnetic radiation and nuclear reactions are the main mechanisms governing the evolution of the Universe after the Big Bang: Astrophysics is familiar to the nuclear scientist.

Moreover, anyone with a long term vision can appreciate the virtue of doing research at the world front line, whatever the field. Why should one limit the interests of the Institute to nuclear power plant technology? on which ground should one exclude someone working in another field? If one wants to build a solid nuclear science branch to be a mainstay for the development of nuclear power plants, one needs a good base of modern knowledge and techniques. You are using equipment and methods that are universal; knowing how to exploit them can be used in many places elsewhere.

I think that what you are doing integrates well in the chain of knowledge and expertise required for working in nuclear physics. I know that some people have said that your research line is too far remote from that of the institute. But you know that in Vietnam not everybody can understand the scope of your research. Some of our science leaders and deciders have too practical a vision of science. They must understand that your knowledge and experience are very useful.

VATLY: What is your advice for VATLY to have its future secured?

Hien: I do not have a well worked out solution to offer. This is a difficult question which needs to be discussed. Even if I had an answer, it would only be mine and might even be wrong. In a developed country, the question would not even be raised. But in Vietnam, we are more short-sighted. We have to explain the case to the deciders and convince them. Currently the Minister of Science and Technology (MOST) has announced a plan covering up to 2020 in which 60 centres of excellence will be created all over the

country. What does it mean to be a centre of excellence? It means that the centre has to have a world position. Therefore, the first thing for VATLY to do is to secure a position on the world scene for the young members of the group: you have to grow up. I have talked with the leaders of the Vietnam Atomic Energy Institute (VAEI); your group together with the nuclear physics group will be encouraged to form such a centre of excellence. If you succeed, VATLY will be part of the development plan of VAEI and MOST and you will no longer have to fear to be kicked out.

I have also one concrete suggestion. I think that you are now using a lot of devices and methods which are commonly used in nuclear physics. I propose that you should prepare 2 to 3 practical exercises for other members or students of the institute. I have discussed with the directorate of the institute about their training programme and I believe that you can produce at least 2 such exercises. Trainees will go through your lab, spending 2 to 3 days on one exercise. It would be an important and direct contribution of your group to the development of the institute.

You should also be more active in making your research results known to the colleagues in the institute and take an active part in the academic activities of other groups of the institute, especially those having expertise close to yours, such as nuclear electronics, nuclear safety and environment.

VATLY: It is exactly the kind of thing we can do and are happy to do. We always try to contribute to the life of the institute but what we are doing is quite disconnected from the main stream of the institute, so it is a problem.

Hien: This is right: it needs you to contribute more to the life of the institute and the science leaders to be more strongly convinced of the chance that the presence of a research group such as yours, with Pierre at its head, represents for the country.

VATLY: Ideally there should be an astrophysics institute in Vietnam. How do you think about that?

Hien: It is true that in Vietnam we have no such institute. But the current condition is not yet ripe for the establishment of such an institute, the most difficult is to convince the leaders. The best

way to persuade them is to be strong and hold a clear position on the international scene. The way to an institute of astrophysics is probably via a few intermediate steps. For example, if in a near future the institute and MOST would support your getting research equipments from the annual supplementary expenditure budget (about 100K USD), it would mean that your group is treated equally with others. This is the kind of breakthrough that you should aim at.



Hien with young members of VATLY (from left to right, Phuong, Nhung, Diep and Cuc).

Your ambition to develop from a small research group to a larger scale is excellent. You need to secure your position on the international scene by collaborating with prestigious foreign astrophysicists and, together with other astrophysicists in Vietnam, you will gradually be able to form an astrophysics centre.

VATLY: We know that you have been writing many articles describing your views on how to push the development of science and education in Vietnam. What do you think should be improved in priority?

Hien: Indeed, I recently wrote an article where I remark that Vietnam is not following the same route as other countries follow. For example, we have not accepted the world standards for science research, instead we use administrative rules. And I conclude that this fact must be recognized by the leaders in the domain of science and education: they must realize that we are acting differently from other countries that have enjoyed advanced science and education systems for several hundred years. To be backward is awful

but to be lost is even worse. We must change our policy to have any hope for progress.

Concerning education, what should we change? I may be a bit pessimistic but I think that the problem of education in Vietnam is a social problem, fraud and deceit are everywhere and are at its root. This is a systematic disease which many people have discussed in recent years. Therefore, we have to solve the social problems in parallel with the reform of education, and I do not think that we could have a solution to improve immediately both science and education. We first need the leaders to become conscious of the need to change policy. Let us join effort and do our utmost to reach this goal as soon as we can.

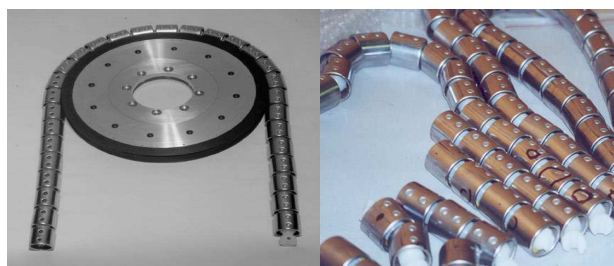
A PELLETRON AT HUS

Last year, the Department of Nuclear Physics of the Hanoi University of Sciences (HUS) acquired a small tandem Van de Graaff. Pierre comments on the hope that it could be used as a focus of expertise to bring together physicists and engineers interested in particle accelerators.

In June 2011, the Department of Nuclear Physics of HUS bought a tandem Van de Graaff equipped with two beam lines, one for ion implantation and the other for material sciences studies: Particle Induced X-ray Emission (PIXE) and Rutherford Back Scattering (RBS). It is a very beautiful little machine, particularly robust and safe. It costs around 2 million USD. The terminal high voltage is 1.7 MeV, meaning 3.4 MeV protons and, of course, higher energies for multiply charged ions. It is equipped with two sources of negative ions (one using Cesium sputtering for the proton beam, the other using RF charge exchange for the α beam). Intensities up to 200 nA are available for material analysis and several ten μ A for ion implantation. The charging belt is a chain of small metallic pellets separated by an insulator, hence the name Pelletron. It is a self-shielded machine with a very low radiation level: 5 μ Sv/hr at the high energy end, in contact with the pressure vessel, for a 5 μ A Au⁺³ analysed beam.

Usually, such machines are operated by the material science departments of universities as the nuclear physics that can be done with them

was already done fifty years ago. But they are also very useful to train students and make them familiar with elements of the physics of particle accelerators. While the machine is very much underused today, training sessions will soon be organised. They will address undergraduate and master students in material sciences and condensed matter physics, nuclear physics, engineering, etc. Moreover, an important material science community exists in several Vietnamese universities and institutes, in particular at the Vietnam Academy of Sciences and Technology (VAST) and at the Hanoi University of Sciences and Technology (HUST); they will now be contacted (they had not been involved at the time of purchasing) and will be encouraged to use the machine, which should be a very useful tool for their research work.



The Pelletron charging belt and its pellets



The HUS Pelletron and the two beam lines.

Several accelerators are currently operated in Vietnam for nuclear medicine (isotope production for tracers, PETs, etc.). They include three cyclotrons with energies of 30, 11 and 9 MeV as well as several other smaller machines. However, the particle and nuclear physics community has not yet succeeded to build

sufficient expertise around particle accelerators. The Institute of Physics owns a 14 MeV neutron generator (10^{10} pps) donated by Hungary in 1974 and a 15 MeV electron Microtron donated in 1982 by DUBNA. But both machines have stopped being operated many years ago. A bad radiation accident occurred in 1992 at the Microtron, due to the lack of safety interlocks and proper procedures. This contrasts with the Dalat research reactor, commissioned in 1962 and upgraded in 1982-1984, which has been successfully operated since then and used for both the training of students and applications such as isotope production.

The acquisition of the HUS Pelletron is a good opportunity to correct the present unsatisfactory situation. In spite of the modest size of the machine, its location makes it ideal to

gather the few accelerator experts who exist in Vietnam, to create a community with regular activities such as seminars, lectures, summer schools where they can exchange their experiences, train newcomers to the field and eventually convene a working group preparing a proposal for the acquisition of a future facility. It is indeed the role and mission of universities to take such initiatives. The Pelletron experience has illustrated the well known fact that investing in an expensive new facility can only be in response to a well documented and argued proposal by an existing community of potential users. The Pelletron will hopefully be used to build such a community as the need for experienced engineers and scientists in the country will keep increasing in the coming years.

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–PHOTO ALBUM –



The 1st Southeast Asian Young Astronomers Collaboration (SEAYAC) Meeting took place in Palawan (Philippines)



Hiep, Nhung and friends with a water rocket built by an Indonesian primary school teacher



Hiep and other VATLY members after his master thesis defence.



Son and Hoai at their wedding ceremony, with Tuan Anh and Thao on the left and Nhung and Dong on the right



Son and Hoai



Thao and her Malaysian friends and hosts, in an Indian restaurant of Kuala Lumpur



Thao and her Malaysian friend Norhayaty in UKM



Hoai at Louvre museum



Tuan Anh and Hoai's roommate, Lisseth, in Grenoble



Thanh Nam, Dong's son, 45 days old



Dong and his son