

Meeting on the ASEAN Federation of Physics Societies (AFPS)

On 29 August 2017, in the same month that commemorates the fiftieth year of the formation of ASEAN, senior physics representatives from ASEAN came together at the Nanyang Executive Centre in NTU Singapore to endorse the Charter for the official establishment of a very-much desired ASEAN Federation of Physics Societies (AFPS). It was a fruitful meeting with the signing of the AFPS Charter and Constitution by the ten ASEAN Physics representatives at the roundtable. The event was supported by the Singapore's Ministry of Foreign Affairs.

The establishment of AFPS is an important milestone as it will serve as a platform to

- i) strengthen the capacity of physics education and research in the region,
- ii) facilitate the sharing of information and collaboration across the member states,
- iii) improve how resources could be accessed and distributed across the communities as well as
- iv) provide a strong collective negotiating power in cooperation and collaboration with other regional and international physical societies.

Moreover, the establishment of AFPS allows physics as a scientific field to be further elevated and gain a higher level of respect within ASEAN while functioning to spur the formation of physical societies in four ASEAN countries that are still without (Brunei, Cambodia, Laos and Myanmar). The official formation of AFPS is a major milestone after months of behind-the-scenes painstaking work involving the drafting of the charter and constitution.



Opening Ceremony of the ASEAN meeting: (from left) Prof Siaw Kiang Chou (Advisory Board Member from the ASEAN Committee on Science and Technology), Mr Chee King Tan (Deputy Director of the ASEAN Socio-Cultural Community, Singapore's Ministry of Foreign Affairs), Prof Kok Khoo Phua (Founding Director of IAS NTU) and Prof Rajdeep Singh Rawat (President, Institute of Physics Singapore).

The meeting began with opening remarks by Prof Kok Khoo Phua (Founding Director of IAS NTU), Mr Chee King Tan (Deputy Director of the ASEAN Socio-Cultural Community, Singapore's Ministry of Foreign Affairs) and Prof Rajdeep Singh Rawat (President, Institute of Physics Singapore). Each speaker was in agreement that concrete steps have to be taken to ensure that ASEAN, after fifty years in existence, should finally attain a level playing scientific field with other advanced regions and international organizations, with the most important step being that of capacity building and training of new generation of physicists.

Prof Siaw Kiang Chou, Advisory Board Member from the ASEAN Committee on Science and Technology (COST) gave an in-depth overview of the work of COST, repeatedly emphasizing the need to draw on the particular expertise of the physicists to bear on the nine sub-committees underlying the ASEAN COST. Of these nine, there are at least three sub-committees that could be seen as intersecting with the areas of the physical sciences in the form of material science and technology, meteorology and geophysics, as well as space technology and applications.

Prof Chou also spoke of the importance of continuing the pursuit of international collaborations and dialogues with international partners as had been done since the early days of the establishment of ASEAN. He pointed to the four strategic thrusts set out in the ASEAN Plan of Action on Science, Technology and Innovation (STI), made ready for implementation between 2016 and 2025. The four thrusts aim to encourage inter-sectoral collaborations; talent mobility, connectivity and inclusiveness; public awareness of STI-related matters and the establishment of systems that could establish smart STI-relevant partnerships – 2015 saw the year when innovation was added into the mix with science and technology. There is also an ASEAN Science, Technology and Innovation Fund (ASTIF) established that could provide the necessary seed funding for approved projects.

The rest of the morning session was then dedicated to going over the proposed Charter and Constitution, with the participating member states contributing to how best to push the agenda of AFPS forward to ensure sustainability while not repeating the mistakes of previous regional organizations set up to advance the cause of the physical sciences.



The historic signing of the charter established a memorandum of understanding between the physics communities of the ten ASEAN countries that would lead to closer collaborations in training programmes, periodic conferences aimed at promoting regional research excellence, and the coordination of research and developmental priorities. The witnesses to the official establishment of AFPS included prominent physicists from CERN with Professors Emmanuel Tsesmelis, John Ellis and Albert de Roeck, from Institute of High Energy Physics in China with Professor Yifang Wang, from National Astronomical Observatories in China with Professor Di Li, and from National Synchrotron Radiation Research Centre in Taiwan with Professor Shangjr Gwo. Also present was a delegation from the Sakha Republic of the Russian Federation comprising the Minister for Education and Science.

There were also presentations by representatives of each ASEAN country delegation on the programmes for AFPS. They addressed the urgent needs of many of the still-developing countries of ASEAN and also matters of regional importance.

Prof Phua will act as the Interim President for the formation of AFPS and IAS NTU will serve as the AFPS secretariat for one term (three years). Nomination for key posts will be held in October and the online election in November. Announcement of election results will be made in December 2017.

ASEAN representatives of the signed AFPS Charter:

1. Mohd. Khairul Zarifi Bin Haji Masri (Universiti Brunei Darussalam, Brunei Darussalam)
2. Chan Oeurn Chey (Royal University of Phnom Penh, Kingdom of Cambodia)
3. Mitra Djamal (Indonesian Physical Society, Republic of Indonesia)
4. Khamphouth Phommason (University of Laos, Lao People's Democratic Republic)
5. Kurunathan Ratnavelu (Malaysian Institute of Physics, Malaysia)
6. Pho Kaung (University of Yangon, Union of Myanmar)
7. Cristine Villagonzalo (Samahang Pisika ng Pilipinas, Republic of the Philippines)
8. Rajdeep Singh Rawat (Institute of Physics Singapore, Republic of Singapore)
9. Boonrucksar Soonthornthum (Siam Physics Society, Kingdom of Thailand)
10. Nguyen Dai Hung (Vietnam Physical Society, Socialist Republic of Vietnam)

ASEAN Workshop on Frontiers of Physics 2017 in partnership with CERN



The Frontiers of Physics workshop was held on 30 August 2017 in conjunction with the inauguration of AFPS from the day before. The workshop was not merely about reporting on the future potential of cutting-edge big collaborative experiments in Europe and East Asia; nor was it about the knowledge transfer enabled by the technologies developed through research agenda at the cutting-edge. Rather, it was about sharing information about the resources, facilities and possibilities in physics that could be utilised by members of the ASEAN communities, in collaboration with other emerging and mature physics collaborations, to facilitate and bring the work they are already doing into the next level.

Even as material and energy science remain primary to the research agenda of ASEAN, as had been articulated in the proceedings of the meeting from the day before, the region is in the process of developing research agendas in the area of high energy particle physics, astrophysics and cosmology, space science, biophysics, and biomedical sciences, among others, that will, and are, using technologies developed as a consequence of the instrumentations built for doing big science.

At this time, the popular CERN Schools that had been taking place annually at various countries had also taken place in the ASEAN region in Malaysia, Thailand and Singapore, among others. To date, all of the ASEAN countries have developed relationships with CERN, from having initiated first contact to becoming full-fledge membership within some of the experimental collaborations. Both Malaysia and Thailand are members of the CMS collaboration while the Philippines and Singapore have direct association with CMS. Indonesia is a member of the ALICE collaboration while at least nine of the ASEAN countries are now sending summer students to CERN.

In his opening remarks, Prof Emmanuel Tsismelis spoke of how CERN could contribute more to the development of physics research and development in ASEAN such as by contributing computer servers and the establishment of digital libraries (the latter of which CERN has been pioneering since the early days of the Internet). And in his presentation on the future of accelerators, Prof Tsismelis spoke of the multi-level and multi-layered processes involved in the confirmation of the discovery of the Higgs boson, with the possibility of there being a composite of Higgs bosons of which the earliest discovered form is an inkling of more to come. More importantly, he spoke about the expertise involved in building up the collaborations at CERN, especially the important contributions made by graduate students who came from all over the world, to contribute brainpower towards accelerating the progress of the discoveries being made.

Separately, Professor Albert de Roeck of the CMS collaboration would confirm the urgency needed in dealing with the massive amount of data produced by the experiments at CERN requiring a strong international grid of expert analysts to sort through all the data produced. Prof John Ellis (CERN) listed some important areas of research that can help resolve some of the still unexplained fundamental issues: the origin of dark matter, masses of neutrinos, the hierarchy problem, inflation, and quantum gravity, all of which could find resolution through supersymmetry should that become a reality. It would herald new physics both predicted and unprecedented.

Even as the next generation of circular and linear colliders are being built at CERN to edge closer to the exploration of the abovementioned fundamental physics, Prof Yifang Wang from IHEP reported on how China has been developing in parallel, CEPC and SppC, its own massive laboratories for such explorations. Furthermore, in the search for dark matter, a 2400-metre deep laboratory at Liangshan in Southern Sichuan called the China Jinping Underground Laboratory (CPJL) has been in operation since 2010; this laboratory now has entered phase 2. The High Energy Radiation Detector (HERD) will join the already launched Dark Matter Particle Explorer (DAMPE) at the Chinese Space Station by 2020/2021, while a Higher-Energy Photon Source will be constructed by 2018. For explorations into black hole and other extra-terrestrial signals emanating from other galaxies, Prof Di Li from China's National Astronomical Observatories described how the Five-Hundred Meter Array Spherical Telescope in the form of cable mesh and triangular reflectors have been in operation since 2016, built as it was, on the curvature provided by a natural depression at Guizhou, China. The telescope was built with the purpose of detecting exotic signals from the universe while finding more evidence on predicted and preliminarily confirmed cosmological entities.

Prof Shangjr Gwo spoke on the National Synchrotron Radiation Research Center (NSRRC) in Taiwan. It is a major photon source that produces high-intensity but low-emittance rays at hard and soft x-ray wavelengths providing high-resolution spectroscopic measurement and 44 beamlines with beam energy of up to 3 GeV. The facility is highly suited for multidisciplinary research in engineering, biomedicine, and chemistry, among others. Although the Taiwanese government had spent almost TWD300 million on the construction of the facility, it is offering the use of the facility without fees to international researchers interested in using the facility for advancing their research, as long as they submit a proposal for use in advance.

All of the presenters who spoke of the above-mentioned large-scale facilities were unanimous in calling upon ASEAN physicists to take advantage of these facilities even at this time. In making these facilities more accessible to resource impoverished countries, a more level playing field could be created that will provide the encouragement for still developing countries to venture into fundamental physics research, even as the technologies that come out of the development of these instruments will certainly be applicable to the solution of pressing problems. One such useful transfer of technology came in the form of the Proton Therapy Centre at Singapore's National Cancer Centre as well as in the development of renewable energy resource, in the form of solar power, to build propulsion engines for space missions as are done at NTU's Plasma Sources and Application Centre.

The workshop also discussed some of the theoretical possibilities that could still unfold with the continuing work done on the recent discoveries at the quantum and cosmic scales, from the process of validating high energy particles to further knowledge that could be derived of

gravitational waves, and the important deployment of the outcome of such research for solving bread-and-butter issues. The workshop aims to raise the ambitions of the research agenda of the ASEAN countries while catalysing the next level of international collaborations with the more developed scientific communities in Asia and Europe.

Drafted by: Clarissa Lee

Vetted by: Prof Ngee Pong Chang