Nobel Laureate Arthur B. McDonald Discusses Unlocking the Mysteries of the Universe Through International Collaboration

Campus focus

Following the visit of 1999 Nobel Prize in Physics laureate Gerardus ’t Hooft, the Department of Physics once again hosted a distinguished Panda Lecture on March 9 at 2:00 p.m. in the Chang Yeo Lan Hall of the Hsu Shou-Chlien International Conference Center. The lecture featured 2015 Nobel Prize in Physics laureate and Queen’s University professor, as well as Director of the Sudbury Neutrino Observatory Institute, Prof. Arthur B. McDonald. He delivered a lecture titled “Answering Existential Questions About Our Universe and Its Evolution.” The event was also livestreamed and attracted more than 310 faculty members, students, and researchers from both within and outside the university.

Vice President for Academic Affairs Hui-Huang Hsu welcomed Prof. McDonald and introduced the purpose of the Panda Lecture series, noting that the event was made possible through the Taiwan Bridges program, demonstrating the University’s commitment to international academic exchange. He also expressed special thanks to Uwe Morawetz, Chairman of the World Peace Foundation, for facilitating the event.

Dean of the College of Science Hung-Chung Hsueh then introduced Prof. McDonald, whose research team resolved the solar neutrino problem, earning him the Nobel Prize alongside Prof. Takaaki Kajita of the University of Tokyo, who had also previously delivered a Panda Lecture at the university in 2023. A video was shown to revisit their Nobel Prize-winning moment.

In his lecture, Prof. McDonald reviewed key developments in cosmology and particle physics over the past 60 years. He emphasized that through open and tight international collaboration, scientists have constructed a picture of the universe’s evolution from the Big Bang to the present,

approximately 13.6 billion years. By integrating astronomical observations, particle physics experiments, and cosmological models, humanity has gained deeper insight into the origin of the universe, the formation of cosmic structures, and the composition of matter and energy.

He further discussed major contemporary topics in cosmology, including dark matter and dark energy. Studies indicate that ordinary matter accounts for only about 4% of the universe, while the rest consists largely of dark matter and dark energy. Although dark matter cannot be directly observed, its gravitational effects influence galaxy motion and structure formation. Dark energy, on the other hand, is believed to be responsible for the accelerated expansion of the universe and remains one of the most challenging topics in modern cosmology.

Prof. McDonald also introduced several large-scale international scientific collaborations, including underground dark matter detection experiments, particle accelerator research, and global neutrino observation projects. These large-scale endeavors often require hundreds to thousands of scientists working across borders over extended periods. He specifically mentioned the Bustling Universe Radio Survey Telescope in Taiwan (BURSTT) international project led by Academia Sinica's Institute of Astronomy and Astrophysics, which is currently being planned in collaboration with Tamkang University and led by Assistant Professor Yi-Nan Chin of the Department of Physics.

In concluding his lecture, Prof. McDonald emphasized that scientific research has long exemplified a spirit of international cooperation. Scientists from different countries work together toward a common goal of understanding the laws of nature and the mysteries of the universe. This collaborative model not only advances science but also serves as a model for international cooperation and the promotion of world peace.

In addition to faculty and students from Tamkang University, attendees

included participants from Academia Sinica, National Taiwan University, Bailing Senior High School, and Zhonghe Senior High School. During the Q&A session, several audience members raised questions. Xiang-Jun Liu, a third-year physics student, shared that when facing confusion in her studies, she realized through questioning that engaging in discussions and revisiting textbooks can reveal new perspectives and transform confusion into motivation.

After the lecture, Prof. McDonald visited iST Book House to engage in close interactions with faculty and students from the Department of Physics, sharing research experiences and responding to questions about studying physics, challenges in scientific research, and overcoming setbacks. The session was lively and engaging.

Earlier that day, at 10:30 and 11:00 a.m., Prof. McDonald and his spouse, along with Uwe Morawetz, were accompanied by Academic Vice President Hui-Huang Hsu, Dean Hung-Chung Hsueh, and Chair of the Department of Physics Cheng-Hao Chuang to visit President Huan-Chao Keh and Chairperson Flora Chia-I Chang. Both extended a warm welcome and introduced the origins of the Panda Lecture, presenting Prof. McDonald with a Panda trophy and a commemorative vase decorated with calligraphy by renowned masters Chi-Mao Lee and Ben-Hang Chang, featuring the campus scenery and the school anthem.

Prof. McDonald remarked that he was particularly impressed by the concept of “futures education” showcased in the University History Gallery. He noted that the exhibit not only presents the institution’s historical legacy but also emphasizes a forward-looking vision, which he found remarkable. He even took photos to share with his own university leadership as a reference. He also shared his impressions of cultural experiences arranged during his visit to Taiwan, including learning about traditional Chinese medicine, tasting Taiwanese tea, and visiting the Taipei 101 tuned mass damper.

In light of Tamkang University's active promotion of AI-integrated teaching, Prof. McDonald, along with President Keh and Vice President Hsu, also exchanged views on how higher education should adapt to AI. Discussions covered cultivating students' understanding of AI, helping faculty adapt, transforming core educational content, and emphasizing AI ethics. Prof. McDonald cited the views of scholar Geoffrey Hinton, advocating for the development of AI systems with humanistic values. He also shared perspectives on the role of campus housing in fostering peer relationships and the importance of international collaboration in scientific advancement. Despite being 82 years old, he continues to travel internationally and engage in scientific exchanges, demonstrating an active and positive outlook on life.


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射的光子相比。
星空夜晚望向外面，你
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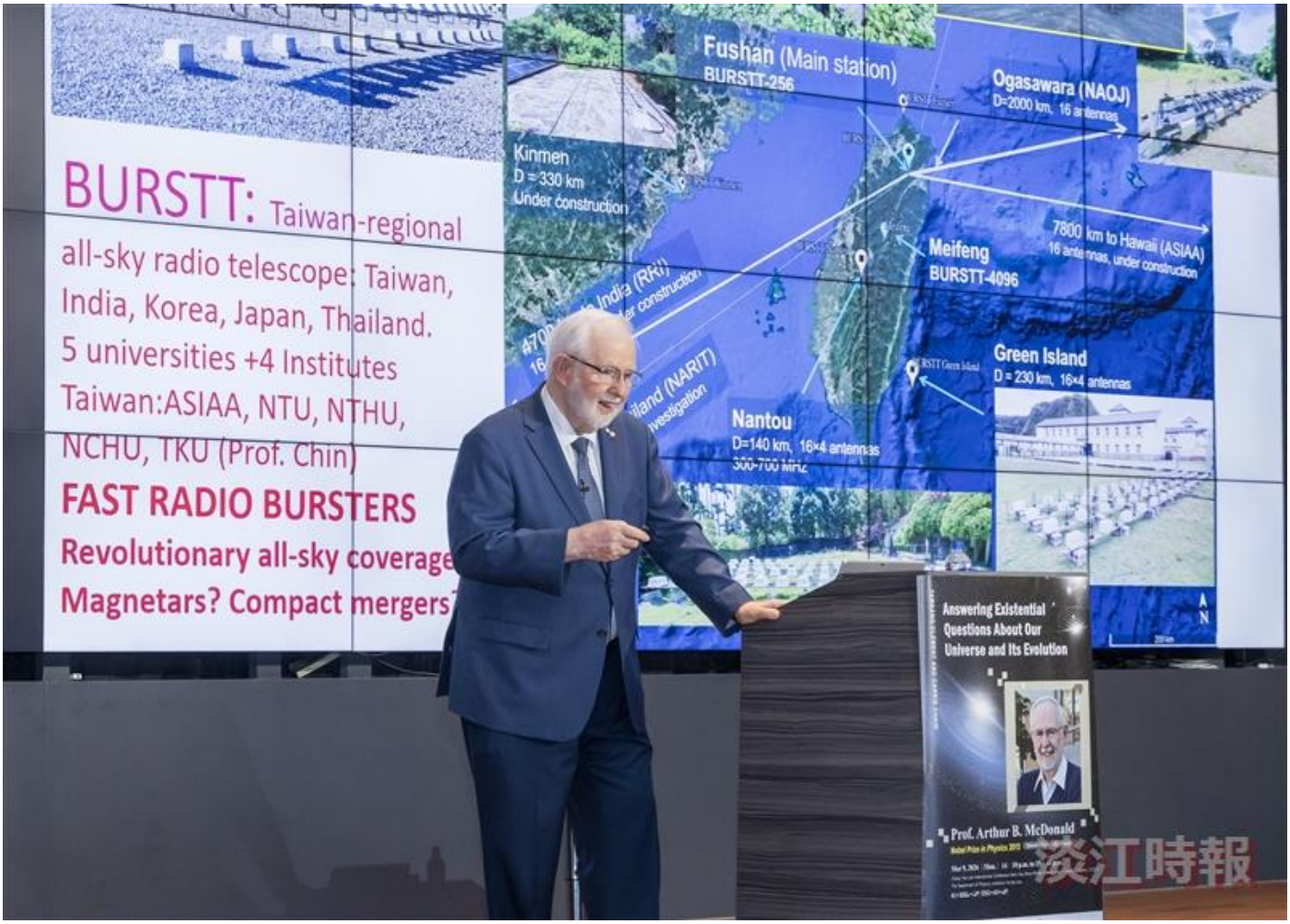
BURSTT: Taiwan-regional
all-sky radio telescope: Taiwan,
India, Korea, Japan, Thailand.
5 universities +4 Institutes
Taiwan:ASIAA, NTU, NTHU,
NCHU, TKU (Prof. Chin)
FAST RADIO BURSTERS
Revolutionary all-sky coverage
Magnetars? Compact mergers?
Fushan (Main station)
BURSTT-256
Ogasawara (NAOJ)
D=2000 km, 16 antennas
Kinmen
D = 330 km
Under construction
Meifeng
BURSTT-4096
7800 km to Hawaii (ASIAA)
16 antennas, under construction
Green Island
D = 230 km, 16×4 antennas
Nantou
D=140 km, 16×4 antennas
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SNO
Canada
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我們是直接從這個井道往下走，這是一條相當直接的取得
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淡江大學創辦人張建邦博士暨張姜文錙伉儷熊貓講座
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