

Historic Achievement

Director of IPMU

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I've always believed that Kajita's discovery in 1998 should be awarded Nobel Prize in Physics. All Nobel Prizes in particle physics so far were given to achievements that led to the establishment of the theory called "Standard Model". On the other hand, Kajita, and the joint awardee Art McDonald, have shown for the first time in history that the Standard Model cannot explain everything in the Universe. Their work is historic in that they have shown that the Standard Model is not the ultimate goal, but rather needs to be expanded to a yet bigger framework. Actually there is a long-standing problem "Why do we exist in the Universe? Universe created matter and anti-matter one to one, but somehow the balance was tilted towards matter at the level of one part in billion, so that matter and anti-matter did not completely annihilate each other and a small amount of matter remained to date. How was the balance changed?" This is literally a matter of life and death for us. Now that they discovered that the neutrinos have tiny amount of mass, there is a very strong anticipation in the community that neutrino is our "father" who protected us from the complete annihilation, by tilting the balance between matter and anti-matter. This is a theory put forward by Fukugita and Yanagida at Kavli IPMU, but it became very plausible after Kajita's discovery. As a matter of fact, this research is pursued by the

Hyper-Kamiokande proposal in Japan, and particle physics in the US puts research in this area as its first priority. Clearly Kajita's work changed the direction of research in particle physics worldwide.

Kajita has been a Principal Investigator from the beginning of Kavli IPMU. We are all ecstatic that one of our members received Nobel Prize. In addition, this year's Breakthrough Prize was also awarded to Kajita as well as Yoichiro Suzuki, and the New Horizon Prize to Yuji Tachikawa, also our members. Series of major awards is a testament to the high quality of researchers at our institute. What wonderful news! I expect more research results of worldwide recognition will come out from Kavli IPMU. I'm looking forward to a bright future.

