

Karsten M. Heeger

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Karsten Heeger joined the University of Wisconsin faculty in summer 2006. His research focuses on the experimental study of neutrinos; weakly interacting elementary particles with tiny mass that fill our Universe. They are remnants of the Big Bang and are produced in nuclear decays and exploding stars. Neutrinos may hold the clue to why we live in a universe filled with matter and not antimatter and play an important role in many areas of subatomic physics, astrophysics, and cosmology.

In his research Karsten works on precision studies of neutrino oscillation, a quantum mechanical phenomenon that allows one kind of neutrino to transform into another type, and the search for neutrinoless double beta decay. This yet-unobserved process would prove that neutrinos are their own antiparticles. For his research Karsten and collaborators have built experiments in deep underground locations in Canada, Japan, and Italy far away from cosmic rays and environmental backgrounds. There they make measurements of neutrinos from the Sun, from inside the Earth, and from man-made sources such as nuclear reactors. Since coming to Wisconsin Karsten has been leading the construction of a new set of neutrino detectors at the Daya Bay nuclear power plant near Hong Kong. This US-China partnership in high-energy physics will precisely measure the oscillation of antineutrinos as they stream from the reactors and open a window to understanding if neutrino oscillation can explain the observed predominance of matter in the Universe.

Karsten received his undergraduate degree in physics from Oxford University and his Ph.D. from the University of Washington in Seattle where he worked with Prof. Hamish Robertson on a model-independent measurement of the solar ^8B neutrino flux in the Sudbury Neutrino Observatory (SNO). In 2001 the SNO experiment discovered the flavor transformation of solar neutrinos, provided evidence that neutrinos have mass, and solved the long-standing solar neutrino problem. For his thesis work he was awarded the 2003 APS Dissertation Award in Nuclear Physics. Before joining the faculty at the University of Wisconsin he was a Chamberlain Fellow and scientist in the Physics Division at Lawrence Berkeley National Laboratory.

In 2008 he received Outstanding Junior Investigator awards from the Department of Energy Office of High Energy Physics for the search for the last unknown neutrino mixing angle θ_{13} at Daya Bay and from DOE Nuclear Physics for the investigation of neutrino properties with bolometric detectors. Karsten was awarded an Alfred P. Sloan Research Fellowship in 2009.

Karsten is married to UW scientist Reina Maruyama. They live with their daughter Yuki in Shorewood Hills and enjoy hiking, skiing, and playing the violin.