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Nobel Prize Winning Nuclear Physicist Lectures on Neutrino Detection, Military Application

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By MC2 Michael Ehrlich

Dr. Ferenc Dalnoki-Veress, Scientist-in-Residence at the James Martin Center for Nonproliferation Studies and Adjunct Professor at the Middlebury Institute of International Studies at Monterey speaks to NPS students, faculty and staff on "Solving the Solar Neutrino Puzzle and Anti-Neutrino Applications for Arms Control," in Spanagel Hall, Feb. 26. Dalnoki-Veress, on campus for an NPS Department of Physics Colloquium, was a member of the Sudbury Neutrino Observatory (SNO) team whose work was honored with the 2015 Nobel Prize in Physics for solving the solar neutrino puzzle.

The solar neutrino problem refers to a longtime discrepancy between the measured number of neutrinos flowing through the Earth from the sun, and the number of neutrinos solar models theorized. The SNO team proved that the reason for the missing neutrinos was not because of a lack of understanding of the nature of the sun, or because of problems with prior experiments. Rather, it was because of a unique property of neutrinos that allows them to switch between different 'types' of neutrino particles.

"As so often happens in science, when the theoretical is finally confirmed by experiment, scientists find clever ways to adapt the new knowledge to other fields," said Dalnoki-Veress, noting the discovery could have far-reaching applications.

"Let's imagine you place large detectors in strategic locations, that are running very quietly and very slowly," explained Dalnoki-Veress. "You could theoretically detect anything that had these antineutrinos if they were to come by. For example, you could detect [everything from] clandestine reactors to nuclear explosions."

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