

Columbia University Department of Physics

Particle Seminar Series



“SEARCHING FOR θ_{13} USING NEUTRON CAPTURE ON HYDROGEN IN DOUBLE CHOOZ”

Double Chooz is a reactor antineutrino experiment built to measure θ_{13} . The experiment uses two detectors at different baselines (400 m and 1 km) to precisely measure the disappearance of $\bar{\nu}_e$ from the Chooz reactor cores in Ardenne, France. Our inverse beta decay (IBD) signal is a two-fold coincidence of a prompt positron followed by a delayed neutron capture on Gadolinium (Gd). The delayed neutron capture releases 8 MeV of energy from multiple gamma rays and is easily distinguished from natural radioactive backgrounds. While delayed neutron capture on Gd is used in all the reactor-based θ_{13} measurements, it is also possible to detect IBD via delayed neutron capture on Hydrogen. In Double Chooz the Hydrogen detection channel has twice the signal statistics as the Gd detection channel and provides an independent data sample with which to cross-check the Gd analysis result. Furthermore, because of the very different nature of the backgrounds and systematic uncertainties, a combination of the Hydrogen and Gd analysis may help us better constrain the value of θ_{13} . In this seminar, I present the current status and preliminary results from the Hydrogen analysis in Double Chooz.



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1:00 PM 705 Pupin Hall