



PHYSICS AND ASTRONOMY COLLOQUIUM

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Neutrinos & Majorana Fermions/ Stanford University

“EXO & the Quest for Majorana Neutrino Masses”

Abstract

With the definitive evidence for neutrino oscillations collected in the last decade, we now believe that neutrino masses are non-zero. Oscillation measurements, however, only measure mass differences and give us little information about the absolute values of neutrino masses.

The hypothetical phenomenon of neutrino-less double-beta decay can probe the neutrino mass scale with exquisite sensitivity. This process, if observed, would also imply that neutrinos, unlike all other spin-1/2 particles, have only two component wave functions and that lepton number is not a conserved quantity. Following the well known principle that there is no free lunch in life, interesting half-lives for neutrino-less double-beta decay exceed 10^{25} years (or $\sim 10^{15}$ times the age of the Universe) making experiments rather challenging. I will describe the EXO program that is developing the tools to search for this rare decay and discuss the recent measurements by EXO-200 that recently discovered the 2-neutrino double-beta decay in ^{136}Xe and substantially improved the limit on Majorana neutrino masses.

Wednesday, January 16, 2013

3:30 p.m.

Bob Wright Centre

Room A104