LEPP JOURNAL CLUB

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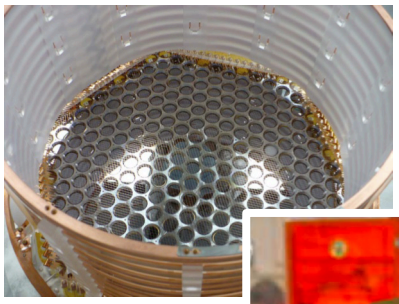
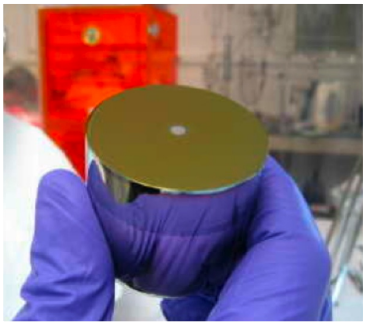
Rare Event Searches: Windows into the World of Neutrinos and Dark Matter

Our current understanding of the Universe hinges, in large part, on the most elusive particles known to us. Neutrinos and Dark Matter, as concepts, have been around for decades. This decade promises answers to many of the still unanswered questions in physics of weak interactions. For neutrinos: are they their own anti-particle? What is the mass scale and hierarchy of the three known neutrino species?

I will focus on the EXO experimental program, a search for the neutrinoless double beta decay of Xe-136, which aims to answer these questions. Preliminary results from the EXO-200 detector will be presented, including our recent first measurement of the two neutrino double beta decay of Xe-136. The broader EXO science program to realize a background-free search by tagging the daughter Ba nucleus will also be covered. For Dark Matter the question is: can it be directly detected at all? If so, what is the mass of the putative particle? The development of the CoGeNT detector technology (designed as a reactor neutrino experiment) has recently played a beneficial role in searches for both light WIMPs and neutrinoless double beta decay. The status of the CoGeNT experiment will be briefly covered. In this light, I will also briefly discuss a new concept that leverages technologies in both the EXO and CoGeNT to search for light WIMPs, among other things.





Thursday

March 15, 3:45pm

401 Physical Sciences Building

(Refreshments 3:30pm)

LEPP, the Cornell University Laboratory for Elementary-Particle Physics, has joined with CHESS to become the Cornell Laboratory for Accelerator-based Sciences and Education (CLASSE). LEPP's primary source of support is the National Science Foundation.