Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

A cryogenic search for neutrinoless double beta decay DANIEL LENZ, University of Wisconsin, Madison, CUORE COLLABORATION — The Cryogenic Underground Observatory for Rare Events, the CUORE experiment, employs the bolometric detector technique to search for neutrinoless double beta decay ($0\nu\beta\beta$) of ^{130}Te. Since the halflife ($T_{1/2}$) for $0\nu\beta\beta$ of ^{130}Te is larger than $T_{1/2} \geq 3.0 \cdot 10^{24}$ y (90%C.L.) a high signal detection efficiency and an extremely low background count rate in the region of interest around the Q-value of 2527 keV is necessary. Large detectors made from natural TeO_2 with an isotopic fraction of 33.8% of ^{130}Te and a total active detector mass of 750 kg will be used as source and detector at the same time, resulting in a high signal detection efficiency. Bolometers provide a good energy resolution and have low intrinsic contaminations, which makes them an excellent detector for searches for $0\nu\beta\beta$. Since the energy response of the detector system is not linear and the detectors have long recovery times, special requirements have to be met by the calibration system. In addition, the sources have to be inserted into the cryostat and cooled from 300 K to approx. 4 K for each calibration, to meet heat load specifications. The CUORE experiment is currently under construction at the Gran Sasso National Laboratory, Italy. The experimental techniques, R&D activities, the current status of the experiment and the anticipated sensitivity are reviewed.

Daniel Lenz
University of Wisconsin, Madison

Date submitted: 01 Jul 2010 Electronic form version 1.4