Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

Proposed facility for a precise measurement of S34 PAUL VETTER, DANIELA LEITNER, REINA MARUYAMA, MATTHAEUS LEITNER, DAMON TODD, Lawrence Berkeley National Laboratory — We propose a new measurement of the cross section for the direct capture reaction ^{3}He(α,γ)^{7}Be at a total uncertainty of 1%. Current and planned solar neutrino experiments seek to measure the total ^{7}Be neutrino flux at this level. A direct comparison at 1% of measured to calculated neutrino flux can constrain models of non-standard neutrino oscillation or "invisible" energy production, and will also constrain the Standard Solar Model, acting as a gauge of the temperature and metallicity of the sun and other main sequence stars. A new accelerator, designed for low energy $<$ 300 keV, with high current ($\approx$ 100 mA) and beam purity is necessary to improve the statistical power of measurements at low energy (at or near the solar Gamow window) to control potential systematic errors. To control target error sources, a favorable design would have a tight final focus, intersecting a dense gas jet target. High resolution germanium detectors can provide good signal to background recovery in direct capture reactions. We are currently designing such an accelerator facility. The proposed facility could be used to measure several direct capture reactions in the H, He, and CNO burning cycles. We will review the limiting uncertainties (experimental and theoretical) which constrain our design, and the current status of the project. Supported by the U.S. Department of Energy under Contract No. DE-AC02-05CH11231.

Paul Vetter
Lawrence Berkeley National Laboratory

Date submitted: 28 Jun 2006 Electronic form version 1.4