

Abstract Submitted
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The Beta Cage: Screening Low Radioactive Backgrounds K. POINAR, D. AKERIB, D. GRANT, R. SCHNEE, T. SHUTT, Case Western Reserve University, S. GOLWALA, Z. AHMED, California Institute of Technology, CRYOGENIC DARK MATTER SEARCH COLLABORATION — The beta cage is a proposed multi-wire proportional chamber that will be the most sensitive device available to screen low-energy (200 keV) betas emitted at rates as low as 10^{-5} counts $keV^{-1} cm^{-2} day^{-1}$ (of order 10^{-4} Bq/ m^2). The expected sensitivity and details of the construction and commissioning of its prototype chamber are presented. The prototype beta cage is a 50x50x25 cm frame gridded by stacked wire planes contained in a chamber of gas. To reduce background, the chamber contains only enough mass to stop betas of interest. Samples are placed beneath the grid; the wires multiply the betas and collect their electron avalanche. Readouts allow discrimination of its events from background and determination of the beta (or alpha) source. The beta cage has potential use in carbon or tritium dating, with $^3H/^1H$ sensitivity of 10^{-20} and $^{14}C/^{12}C$ sensitivity of 10^{-18} . Its design was motivated by CDMS, whose sensitivity to the dark matter candidate WIMPs is currently limited by low-energy beta contamination.

Kristin Poinar
Case Western Reserve University

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