Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Expected Backgrounds of the BetaCage, an Ultra-sensitive Screener for Surface Contamination BOQIAN WANG, RAYMOND BUNKER, RICHARD SCHNEE, MICHAEL BOWLES, MAREK KOS, Syracuse University, ZEESHAN AHMED, SUNIL GOLWALA, ROBERT NELSON, Caltech, DARREN GRANT, Alberta University, BETACAGE COLLABORATION — Material screening for low-energy betas and alphas is necessary for rare-event-search experiments, such as dark matter and neutrinoless double-beta decay searches where surface radiocontamination has become a significant background. The BetaCage, a gaseous neon time-projection chamber, has been proposed as a screener for emitters of low-energy betas and alphas to which existing screening facilities are insufficiently sensitive. The expected sensitivity is 0.1 betas / (keV m^2 day) and 0.1 alphas / (m^2 day). Expected backgrounds are dominated by Compton scattering of external photons in the sample to be screened; radioassays and simulations indicate backgrounds from detector materials and radon daughters should be subdominant. We will report on details of the background simulations and the detector design that allows discrimination to reach these sensitivity levels.

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Date submitted: 11 Jan 2013 Electronic form version 1.4