Abstract Submitted for the CAL13 Meeting of The American Physical Society

Detector R&D for Free and Bound Neutron Oscillation and Annihilation at NNbarX JEFF C. GUEVARA, KENNETH S. GANEZER¹, JIM HILL, BRANDON HARTFIEL, MELISSA BLACKETER, JOSE VENEGAS, California State University, Dominguez Hills, NNBARX COLLABORATION — The NNbarX experiment is proposed to search for free neutron-antineutron oscillations using ultra-cold neutrons from a spallation (particle collisions on heavy nuclei) source at the Fermi National Accelerator Laboratory (Fermilab). Currently the CSUDH sub-group of the NNbarX Collaboration is working on simulations of free and bound neutron oscillations in several planned experiments involving oxygen, carbon, and liquid argon to help fix the design of the detectors, the experimental configuration, and the initial data selection criteria for NNbarX. CSUDH undergraduate students working on this project over the summer used a simulation program originally developed for nucleon event tracking for neutron-antineutron oscillations at Super-K I and modified it for use in NNbarX. When construction of the experiment is finished in 2021, it will be able to confirm or rule out the leading theories of grand unification; these include models with the seesaw mechanism, right-left symmetry, supersymmetry (SUSY), and strings.

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Date submitted: 02 Oct 2013

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