Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Theoretical Comparison Between Candidates for Dark Matter JAMES MCKEOUGH, AJIT HIRA, ALEXANDRA VALDEZ, Northern New Mexico College — Since the generally-accepted view among astrophysicists is that the matter component of the universe is mostly dark matter, the search for dark matter particles continues unabated. The Large Underground Xenon (LUX) improvements, aided by advanced computer simulations at the U.S. Department of Energy's Lawrence Berkeley National Laboratory's (Berkeley Lab) National Energy Research Scientific Computing Center (NERSC) and Brown University's Center for Computation and Visualization (CCV), can potentially eliminate some particle models of dark matter. Generally, the proposed candidates can be put in three categories: baryonic dark matter, hot dark matter, and cold dark matter. The Lightest Supersymmetric Particle (LSP) of supersymmetric models is a dark matter candidate, and is classified as a Weakly Interacting Massive Particle (WIMP). Similar to the cosmic microwave background radiation left over from the Big Bang, there is a background of low-energy neutrinos in our Universe. According to some researchers, these may be the explanation for the dark matter. One advantage of the Neutrino Model is that they are known to exist. Dark matter made from neutrinos is termed "hot dark matter". We formulate a novel empirical function for the average density profile of cosmic voids, identified via the watershed technique in ΛCDM N-body simulations. This function adequately treats both void size and redshift, and describes the scale radius and the central density of voids. We started with a five-parameter model. Our research is mainly on LSP and Neutrino models.

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Date submitted: 29 Sep 2016 Electronic form version 1.4