Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Cosmological Simulations Evidence in Favor of Two-Component Flavor-Mixed Cold Dark Matter M.V. MEDVEDEV, University of Kansas — Many cold dark matter (CDM) candidates are flavor-mixed particles including a neutralino, an axion, a sterile neutrino and some others. An unusual and rather counter-intuitive property of non-relativistic flavor-mixed particles has recently been discovered: in the process of mass-eigenstate conversions, they can escape (or "evaporate") from a gravitational potential even if they are initially trapped in it. Modern CDM cosmology has never accounted for the quantum flavor-mixed nature of the particles. Here we present the results of the state-of-the-art LCDM cosmological simulations, which incorporate flavor-mixing. They demonstrate that a model of two-component flavor-mixed dark matter (2cDM) with small mass-degeneracy provides an excellent fit to astronomical data at both large and small scales. It shows substantial reduction of substructure and softening of central cusps in dark halos whereas the large-scale structure remains intact. This simultaneously resolves two outstanding problems of CDM cosmology known as the "substructure problem" and "core/cusp problem", yet it does not contradict apparent counter-examples and observational constraints. Thus, these findings evidence in favor of the two-component CDM and advance us tremendously toward unraveling the mystery dark ma

Mikhail Medvedev
University of Kansas

Date submitted: 05 Jan 2012 Electronic form version 1.4