Abstract Submitted
for the APR17 Meeting of
The American Physical Society

**Dark-Matter-only simulations of the 2cDM model with $\sigma(v)$ as a solution to the CDM small-scale problems**[1] KEITA TODOROKI, MIKHAIL V. MEDVEDEV, University of Kansas — The standard CDM model is believed to have problems on small – galactic and sub-galactic – scales, namely the substructure problem (SSP), too-big-to-fail (TBTF) problem and core-cusp problem (CCP). Recently, we've shown that a two-component (e.g., flavor-mixed) dark matter (2cDM) model can resolve all these problems altogether via particle elastic collisions (*a lá* SIDM) and particle mass conversions. 2cDM does not have the early-universe problem faced by some alternative multicomponent models, yet it resolves the SSP and TBTF that SIDM cannot do. In the new suite of simulations reported here, we explored the velocity dependence of cross-sections of scattering and conversion, $\sigma(v) = \sigma_0 v^a$, where $\sigma_0$ and $a$ are constants. We found that (i) 2cDM predictions are robust; (ii) many specific 2cDM models are consistent with available observed velocity functions in a wide range of $\sigma_0$, i.e., between 1-0.1 cm$^2$/g, and even down to 0.01 cm$^2$/g for some; (iii) core sizes in dwarfs and clusters further constrain viable models. These models are to be explored in simulations with baryons, star formation and baryonic feedback.

[1]Partially supported by DOE grant DE-SC0016368

Mikhail Medvedev
University of Kansas

Date submitted: 28 Sep 2016 Electronic form version 1.4