Mass-Eigenstate Scattering and Conversion of Non-Relativistic Self-Interacting Flavor-Mixed Dark Matter Particles

A. FORD, M.V. MEDVEDEV, U. Kansas — Some Cold Dark Matter candidates are flavor-mixed particles. Recently, it has been shown that a collision (scattering) of two non-relativistic flavor-mixed particles, as in a self-interacting dark matter model, can cause the particles to experience mass eigenstate conversions, which in turn can ultimately lead to their escape from a trapping gravitational potential of a dark matter halo. Such a process has an important effect on the large scale structure formation and provides an elegant solution to several outstanding cosmological problems. Here we study elementary processes involving flavor-mixed particles – elastic scatterings and conversions – and calculate cross-sections of these processes under various conditions. Our results are of great importance for fundamental theory of the interaction of mixed particles and for understanding of the cosmological structure formation.

1Supported by DOE and NSF.

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Date submitted: 05 Oct 2012