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Impact of realistic halo velocity distributions on the interpretation of WIMP searches and future experimental designs D. SPELLER, A. GAMBOA, UC Berkeley, J. ROLLA, Brown, B. SADOULET, UC Berkeley — The interpretation of Weakly Interacting Massive Particle search results depends heavily on the assumptions made about the distribution of WIMP velocities in the galactic halo. A Maxwell-Boltzmann distribution with a sharp cutoff is usually assumed, but recent attempts to reconcile the claims of DAMA with the exclusion regions of experiments such as CDMS and Xenon 100 are based on threshold effects expected to arise from inelastic scattering, and may be sensitive to the assumed shape of the tail in the distribution. We are using realistic velocity distributions from recent large-scale halo simulations to evaluate the impact of the assumptions underlying the interpretation of dark matter search results. We are also investigating the effects of spatial and velocity inhomogeneities (streams) expected at the solar radius in these simulations. Our goal is to gain more insight into the instrumental challenges faced by a Dark Matter Observatory: requirements for detector mass, background rejection, the need for multiple targets, and the use and extraction of directional information.

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