Asymmetric diffusion in turbulent plasmas[1] MIKHAIL MEDVEDEV, U. Kansas — Particle transport in plasmas with turbulent magnetic fields in the presence of a gradient of the mean magnetic field and weak pitch-angle diffusion is analyzed. We demonstrate that such transport is described by asymmetric diffusion: the generalization of the conventional diffusion process to the case of random walk with unequal probabilities. Using a Markov chain analysis of a toy model, we demonstrate that the particle density distribution becomes exponential in distance, instead of linear as is the case for the standard diffusion process. Some implications of our results are discussed.

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