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Particle Diffusion by Waves in Mirror Geometry TIANHUI LI, ANDREY ZHMOGINOV, NATHANIEL FISCH, Princeton Plasma Physics Laboratory, Princeton University, Princeton, New Jersey, 08543 — By shining a spatially-localized single-frequency wave into a mirror-trapped plasma, a resonance with particles of a certain parallel energy might be created. The resonant particles are selectively accelerated so that their perpendicular energy changes in a chaotic manner, creating a diffusion path along the mid-plane velocity space, and more generally, a diffusion path in a larger phase space that includes radial position. The diffusion equation along the diffusion path is solved, illustrating the importance of boundary conditions. We simulate these wave particle interactions, showing how various spatially varying diffusion coefficients effect this diffusion and present some applications of our analysis such as hot ash removal from fusion devices. The work was done under contract DE-AC02-76CH03073.

Tianhui Li

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