Abstract Submitted
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Transport of particles in chaotic magnetic fields – transition between superdiffusion and normal diffusion[1] F. HOLGUIN, A. K. RAM, MIT — Magnetic fields in regions of low plasma pressure and large currents, such as in interstellar space and gaseous nebulae, are force-free as the Lorentz force vanishes. The Arnold-Beltrami-Childress (ABC) field and the Archontis field are examples of three-dimensional, force-free, helical, chaotic magnetic fields. They correspond to single and double Beltrami flows, respectively. The spatial transport of particles is superdiffusive in the ABC field [1] and normally diffusive in the Archontis field. If these spatially fluctuating fields are added onto a larger amplitude uniform magnetic field, the particle transport across the uniform field depends on the energy of the particles a mix of normal and super diffusion for low energies, and superdiffusion for high energies. In the presence of fluctuating fields with sinusoidal time variation, the particles not only undergo cross-field diffusion but also gain energy. We present results on the cross-field diffusion of particles and on their energization. The transition between normal diffusion and superdiffusion is discussed within the realm of spatial transport. [1] A.K. Ram *et al.*, *Phys. Plasmas* **21**, 072309 (2014).

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