

# **Cosmic-ray transport coefficients from first principles**

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The transport of energetic charged particles in stochastic magnetic fields is described as a diffusive process, the microscopic details of particle motion are absorbed into macroscopic transport parameters. The most important of these are convection, the spatial diffusion tensor and the rate of energy change. The anisotropic diffusion tensor includes drift, parallel- and perpendicular diffusion. Perpendicular diffusion, which is the least understood transport coefficient, is associated primarily with the random walk and mixing of magnetic field lines. We overview theoretical considerations and discuss numerical simulations of particle motion in random magnetic fields. We briefly discuss the rate of acceleration or deceleration.