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The Role of Magnetic Structures in Dynamo Action J. PRATT, Max Planck Institut für Plasmaphysik and Max Planck Institut für Sonnensystemforschung, W.-C. MUELLER, Max Planck Institut für Plasmaphysik — By tracking the movements of Lagrangian particles, we examine the formation of large-scale magnetic structures and current filaments in steady-state 3D turbulent magnetoconvection maintained by dynamo action. The movement of fluid particles evolves differently when large structures develop in the convecting plasma, and this difference is reflected in Lagrangian statistics. We discuss the role that magnetic structures in combination with convective motions play in the dynamo process. Our simulation employs the Boussinesq approximation to the MHD convection equations to allow for the effect of temperature fluctuations on the flow *via* buoyancy forces. Pseudo-spectral simulations performed at resolutions of 512^3 and 1024^3 solve these equations for a geometric cube of plasma with an imposed mean temperature gradient. Boundary conditions are fully periodic and disallow vertical streamers, specifically $k_z = 0$ velocity or temperature modes.

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