

Abstract Submitted
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Two-fluid effects and shear in large-scale dynamos¹ MANASVI LINGAM, AMITAVA BHATTACHARJEE, Princeton University/PPPL — In recent times, two-fluid effects (especially the Hall term) have been increasingly explored in space and astrophysical plasmas. The large-scale and small-scale dynamos with the Hall term were explored in [1] and [2]. Here, we consider the role of shear (and rotation) in conjunction with the Hall term. It was recently shown, by means of a resistive MHD analysis, that the turbulent resistivity becomes tensorial in nature with negative off-diagonal components [3]. However, the Hall term leads to additional couplings, and introduces on-diagonal contributions [1] which can make the diagonal terms negative and drive dynamo growth. Lastly, electron inertia (a hitherto unconsidered two-fluid effect) is shown to further enhance the possibility of a turbulent anti-diffusivity, and thereby drive the large-scale dynamo.

[1] M. Lingam, A. Bhattacharjee, ApJ, in press (2016)

[2] M. Lingam, A. Bhattacharjee, MNRAS, 460, 478 (2016)

[3] J. Squire, A. Bhattacharjee, J. Plasma Phys., 82, 535820201 (2016)

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