

Abstract Submitted
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The role of the Hall current in mean-field dynamo theory¹ AMI-TAVA BHATTACHARJEE, MANASVI LINGAM, Princeton University/PPPL — It is now well established that the Hall current plays a significant role in astrophysical environments. Hence, the role of the Hall term in classical mean-field dynamo theory is investigated [1]. The standard alpha coefficient is modified, and shown to vanish only when a specific double Beltrami state (an outcome of certain Hall MHD relaxation theories) is attained. The dynamics of alpha quenching is also elaborated, and shown to exhibit both similarities and dissimilarities with its resistive MHD counterpart. A noteworthy and unusual feature of this analysis is the emergence of a turbulent resistivity that is not necessarily positive-definite. It implies that, even in the absence of shear and rotation, Hall effects may enable the growth of large-scale magnetic fields. Connections with the Hall MRI dynamo are also briefly discussed via a heuristic model [2].

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

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

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