

Abstract Submitted  
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**Role of Hyperresistivity in Laboratory and Astrophysical  
Dynamics**<sup>1</sup> A. BHATTACHARJEE, Space Science Center, University of New  
Hampshire — It has been known for about 25 years that within the context of  
mean-field dynamo theories, the turbulent electromotive force (emf) can be rep-  
resented as the total divergence of a physical quantity that, in some cases of great  
interest, can be shown to be proportional the gradient of the parallel current density.  
This form of the turbulent emf is often referred to as hyperresistivity (or electron  
viscosity). When hyperresistivity is included in theories of alpha quenching for as-  
trophysical dynamos, it can be shown that in the presence of non-trivial magnetic  
field topologies or differential flows, hyperresistivity remains as the only remnant due  
to a cancellation in the alpha and beta effects of kinematic dynamo theory. In this  
talk, we will discuss the relevance of this concept to the dynamo effect produced by  
the magnetorotational instability, as well as its role in producing fast reconnection  
in weakly collisional plasmas.

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A. Bhattacharjee  
Space Science Center, University of New Hampshire

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