Abstract Submitted
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**Modeling the effects of large scale turbulence in the Madison Dynamo Experiment**[1] ELLIOT KAPLAN, MIKE CLARK, KIAN RAHBARNIA, MARK NORNBERG, ZANE TAYLOR, ALEX RASMUS, CARY FOREST, UW-Madison, ERIK SPENCE, PPPL — Early experiments in the Madison Dynamo Experiment (MDE) demonstrated the existence of electric curresnt which correspond to the $\alpha$ and $\beta$ effects of mean field MHD, ı.e. currents driven parallel to B, and turbulent resistivity respectively. A magnetic dipole moment was measured parallel to the symmetry axis of the flow ($\alpha$) and the induced toroidal field was less than half what would be expected from the mean flow ($\beta$). Traditionally, mean field theory requires a large separation in scale between the mean magnetic field and turbulent eddies in the conductive medium. However, the recent campaign on the MDE eliminated these effects when a baffle was added to eliminate the *largest* scale turbulent eddies. A model is presented that builds $\alpha$- and $\beta$- like effects from these large scale eddies without any assumption of scale separation.

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