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**New Mexico Liquid Metal  $\alpha\omega$ -dynamo experiment: Most Recent Progress** JIAHE SI, RICHARD SONNENFELD, ART COLGATE, New Mexico Tech, HUI LI, Los Alamos National Lab — The goal of the New Mexico Liquid Metal  $\alpha\omega$ -dynamo experiment is to demonstrate a galactic dynamo can be generated through two phases, the  $\omega$ -phase and  $\alpha$ -phase by two semi-coherent flows in laboratory. We have demonstrated an 8-fold poloidal-to-toroidal flux amplification from differential rotation (the  $\omega$ -effect) by minimizing turbulence in our apparatus. To demonstrate the  $\alpha$ -effect, major upgrades are needed. The upgrades include building a helicity injection facility, mounting new 100hp motors and new sensors, designing a new data acquisition system capable of transmitting data from about 80 sensors in a high speed rotating frame with an overall 200kS/sec sampling rate. We hope the upgrade can be utilized to answer the question of whether a self-sustaining  $\alpha\omega$ -dynamo can be implemented with a realistic lab fluid flow field, as well as to obtain more details to understand dynamo action in highly turbulent Couette flow.

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