Abstract Submitted
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Low-dimensional model of mixing in a liquid metal battery DOUGLAS KELLEY, University of Rochester — Adding large-scale energy storage to Earth's electrical grids would accommodate demand variations, enhance grid stability, and enable broad deployment of wind and solar generation. Liquid metal batteries are currently being commercialized as a promising and economically viable technology for grid-scale storage. Mass transport by mixing in their all-liquid electrodes affects battery performance, so predicting flow from known operating conditions (battery current and temperature) would allow for improved battery design. But accurate numerical simulation of these turbulent, three-dimensional, multi-phase flows, including electromagnetic forces and phase change, is challenging and computationally expensive. I will discuss a method for using experimental measurements to construct a simplified low-dimensional model with the potential to predict flow and battery performance. Initial results will also be presented.

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