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Mixing and transport in a liquid metal electrode DOUGLAS KELLEY, University of Rochester, DONALD SADOWAY, Massachusetts Institute of Technology — Adding large-scale energy storage to Earth's electrical grids would accommodate demand variations, reduce the need for gas-fired peakers, 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. But because these batteries are entirely liquid, fluid flow and instabilities affect battery robustness and performance. We present ultrasound measurements of flow in a realistic liquid metal electrode. We find a critical electrical current density above which the convective flow organizes and gains speed, improving battery efficiency. We are also developing numerical models to simulate flow and transport in liquid metal batteries.

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