**MHD MODEL FOR LIQUID METAL BATTERIES**

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**Abstract**: Liquid metal batteries are a new concept for grid-scale energy storage. The three liquid layer density-segregated structure of the battery provides a variety of advantages in comparison to classical batteries: fast kinetics, long life-time, large current densities, easy recycling. The concept of liquid metal batteries and corresponding MHD effects are in a close similarity to aluminium electrolytic production. The aim of this research is to develop a numerical model based on spectral function representation for the three density-stratified electrically conductive liquid layers using 3d and shallow layer approximation to take into account specific MHD effects during periods of battery charge/discharge. The results for the 3d electric current distribution, the mixing velocities for shallow liquid layers and the interface dynamics are presented.

***Key words***: interface waves, liquid metal batteries, magnetohydrodynamic mixing, shallow layer, spectral solution