

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Numerical investigation of collision of two liquid metal droplets under the influence of magnetic field JIACAI HUANG, JIE ZHANG, Xi'an Jiaotong University China, KIRTI SAHU, Indian Institute of Technology Hyderabad, India, MINGJIU NI, University of Chinese Academy of Sciences, Beijing, China — We investigate the collision dynamics between liquid GaInSn droplets under the influence of an applied magnetic field by conducting three-dimensional numerical simulations. The surface tension between liquid metal droplets is much larger than that of the normal liquid droplets. The collision dynamics is influenced by a large number of parameters, namely, the Weber number, Reynolds number, separation distance and the relative velocity of the droplets, along with the applied magnetic field. We have validated our solver by comparing with the earlier experimental results without the magnetohydrodynamics (MHD) effect. Different regimes of coalescence and separation dynamics are observed without the MHD effect and found to show excellent agreements with the earlier experiments. Then we study the effect of the external magnetic field and its direction on the droplet dynamics and regime map of the distinct coalescence behaviors. The underlying physics of the collision dynamics of liquid metal droplets has been analyzed using the resultant flow field.

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Date submitted: 27 Jul 2019

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