

Abstract Submitted
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Irregular magnetohydrodynamic shock refraction in the presence of a normal magnetic field¹ VINCENT WHEATLEY, The University of Queensland, PAVAMAN BILGI, California Institute of Technology, RAVI SAMTANEY, King Abdullah University of Science and Technology, DALE PULLIN, California Institute of Technology — Shock refraction occurs when an incident shock encounters a density interface, which is important in a number of applications. When all waves resulting from the interaction meet at a point, this is termed regular shock refraction. In magnetohydrodynamics, analytical solutions for regular refraction cases show that magnetohydrodynamic waves transport vorticity from the shocked density interface so that it is not a shear layer. This is the mechanism that underpins the suppression of shock driven instabilities in the presence of a magnetic field. Here, we examine the case of irregular shock refraction where the initial magnetic field is normal to the incident shock. Regular analytical solutions are used to map the boundary of the irregular refraction region in parameter space. Beyond this boundary, the structure of irregular solutions is investigated via numerical simulations. Particular attention is given to whether all fluid interface emanating from wave intersection points are free of vorticity.

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