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Impact dynamics of ferrofluid drop on superhydrophobic surface under horizontal magnetic field¹ NILAMANI SAHOO, DEVRANJAN SAMANTA, PURBARUN DHAR, Indian Institute of Technology Ropar — In this study, we focus on impact of ellipsoidal or columnar droplet by horizontal magnetic field on a non-wetting substrate and investigates experimentally the effect of Weber number (We) and magnetic Bond number (Bo_m). The orthogonal spreading depends on the magnitude of applied magnetic field (manifested through Bo_m), since the applied field alters the spherical shape of pre-impact drop into either ellipsoidal or columnar drop. The orthogonal spreading induces non-axisymmetric distribution pre-impact inertial energy along the transverse and longitudinal axes of the applied magnetic field, promoting rebound suppression for a fixed We . With increase in Bo_m , the nature of orthogonal spreading is more prominent to break up symmetry retraction as observed experimentally. In addition, at higher orthogonal spreading ratio, the shattering of liquid lamella occurs due to nucleation of holes at different locations after post impact during retraction phase. We can suggest that the shattering of liquid lamella is critically dependent on the thickness of the liquid film after post impact and the wettability of the surface.

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