

# Observations of the Resonant Right-Hand Instability in the Large Plasma Device

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Parallel collisionless shocks like the Earth's bow shock are formed when two ion-beam instabilities interact non-linearly, the non-resonant instability (NRI) and the resonant right-hand instability (RHI). For low beam densities, the former mode is closely related to the current-driven cosmic-ray (a.k.a. Bell) instability. A detailed understanding of how these instabilities saturate is indispensable in order to model the behaviour of astrophysical environments such as planetary bow shocks or supernova-remnant shocks. Our efforts to create a parallel collisionless shock in a laboratory experiment have yielded high-resolution measurements of the RHI inside the 17-metre LAPD plasma. After an overview of the three theoretical parameter regimes for parallel ion-beam instabilities and their respective nonlinear saturation mechanisms, we present the growth and propagation of the RHI at LAPD.