

Abstract Submitted
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Observation of hypersonic flow dynamics with Bose-Einstein condensates¹ MAREN MOSSMAN, PETER ENGELS, Washington State Univ — Ultracold quantum gases are intriguing systems that exist in highly tunable environments. This tunability makes quantum gases powerful candidates for probing fluid dynamics, where much of the past work has dealt with flow patterns and excitations emerging at or below the speed of sound in the system, i.e. in the near-supersonic or subsonic regime. Here, we conduct experiments with Bose-Einstein condensates that investigate fast-flow dynamics in the hypersonic regime. For example, we observe the emergence of interesting shock-like features when a hypersonic flow of atoms passes a repulsive barrier. We characterize these features and their parameter dependence, such as their dependence on the shape and angle of the barrier. Applications and the current status of this work, along with future directions, shall be discussed.

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