

Abstract Submitted  
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**Low-density molecular gas of tightly-bound Rashba-Dresselhaus fermions** SO TAKEI, CHIEN-HUNG LIN, Condensed Matter Theory Center, The University of Maryland College Park, BRANDON ANDERSON, National Institute for Standards and Technology, VICTOR GALITSKI, Joint Quantum Institute and Physics Department, University of Maryland — We study interacting Rashba-Dresselhaus fermions in two spatial dimensions. First, we present a new exact solution to the two-particle pairing problem of spin-orbit-coupled fermions for arbitrary Rashba and Dresselhaus spin-orbit interactions. An exact molecular wave function and the Green function are explicitly derived along with the binding energy and the spectrum of the molecular state. In the second part, we consider a thermal Boltzmann gas of fermionic molecules and compute the time-of-flight velocity and spin distributions for a single fermion in the gas. We show that the pairing signatures can be observed already in the first-moment expectation values, such as time-of-flight density and spin profiles.

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