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**Pairing in a Strongly Interacting Polarized Fermi Gas**<sup>1</sup> WEN-HUI LI, GUTHRIE PARTRIDGE, RAMSEY KAMAR, YEAN-AN LIAO, DUONG NGUYEN, RANDALL HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston TX, 77251 — We have observed pairing in an atomic Fermi gas of <sup>6</sup>Li atoms with unequal numbers of two components.<sup>2</sup> Beyond a critical polarization, the gas separates into paired core surrounded by a shell of normal unpaired fermions. At polarization smaller than this critical value, however, the atoms of two spins are able to spatially coexist with mismatched Fermi surfaces. The nature of such a system has been a topic of debate for decades. In these experiments, we investigate possible pairing mechanisms in this regime. The results are relevant to predictions of exotic new phases of quark matter and of strongly magnetized superconductors.

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