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Observation of pseudogap phase in a strongly interacting Fermi gas JOHN GAEBLER, JILA-University of Colorado, J.T. STEWART, T.E. DRAKE, D.S. JIN, JIN GROUP TEAM — We use atom photoemission spectroscopy to study the single-particle states of a Fermi gas in the BCS-BEC crossover. Our measurements reveal a BCS-like dispersion with back-bending that persists well above the transition temperature for pair condensation. This strongly supports the existence of incoherent, or uncondensed, many-body pairst at temperatures above the superfluid phase transition, which represents a significant departure from conventional BCS theory. This demonstration that pseudogap physics can emerge in a strongly interacting Fermi gas without the need for, or even the possibility of, explanations that rely on complex material properties should be considered in trying to understand the pseudgap phase observed in high Tc superconductors.

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