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Equation of State of a Strongly Interacting Atomic Fermi Gas[1]
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— We study the equation of state of a Fermi gas with unitarity limited interactions by in-situ imaging of ultracold ^{6}Li at a Feshbach resonance. The low noise density distribution in an external potential directly probes the equation of state under the local density approximation. The equation of state is obtained in two ways: from the local density of the gas, reconstructed using the inverse Abel transformation; and from the local pressure, directly deduced from the 2D column density via an exact relation including the Gaussian potential. Regions of low density allow us to extract the chemical potential and the temperature using the virial expansion of the equation of state. We validate our method using the non-interacting Fermi gas. The experimental results are compared to recent Monte-Carlo calculations.

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