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Bragg spectroscopy of a strongly interacting Fermi gas in the 3D to 2D crossover[1] CARLOS NOSCHANG KUHN, PAUL DYKE, IVAN HERRERA, SASCHA HOINKA, CHRISTOPHER VALE, Swinburne Univ of Tech — Strongly correlated gases of ultracold atoms offer a versatile platform for quantitative studies of many-body physics. Dimensionality plays a key role in setting the properties of the interparticle interactions, for example, in general, the coupling constant in two dimensional (2D) systems depends on the collision energy, unlike 1D and 3D geometries. Here we use two-photon Bragg spectroscopy with large transferred momentum to measure the dynamic and static structure factors of strongly interacting Fermi gases as the dimensionality is tuned from 3D to 2D. From the static structure factor, we determine Tan's contact parameter, which quantifies the likelihood of finding two particles with opposite spins in close proximity to each other. Furthermore, we investigate pair correlations as the 3D scattering length is tuned via a Feshbach resonance to gain insight into how the dimensionality effects pairing.

[1]ARC Centre of Excellence - FLEET

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