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From weakly to strongly interacting 2D Fermi gases PAUL DYKE, KRISTIAN FENECH, MARCUS LINGHAM, TYSON PEPPLER, SASCHA HOINKA, CHRIS VALE, Swinburne University of Technology — We study ultracold 2D Fermi gases of ^{6}Li formed in a highly oblate trapping potential. The potential is generated by a cylindrically focused, blue detuned TEM01 mode laser beam. Weak magnetic field curvature provides highly harmonic confinement in the radial direction and we can readily produce single clouds with an aspect ratio of 230. Our experiments investigate the dimensional crossover from 3D to 2D for a two component Fermi gas in the Bose-Einstein Condensate to Bardeen Cooper Schrieffer crossover. Observation of an elbow in measurements of the cloud width vs. atom number is consistent with populating only the lowest transverse harmonic oscillator state for weak attractive interactions. This measurement is extended to the strongly interacting region using the broad Feshbach resonance at 832 G. We also report our progress towards measurement of the 2D equation of state for an interacting 2D Fermi gas via in-situ absorption imaging.

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