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Probing homogeneous two-dimensional Fermi gases in momentum space LENNART SOBIREY, NICLAS LUICK, FYNN FÖRGER, THOMAS LOMPE, HENNING MORITZ, Universität Hamburg — Ultracold Fermi gases in highly anisotropic traps have recently become available as versatile tools for studying the many-body physics of strongly interacting two-dimensional (2D) many-body systems. However, the available experimental probes have so far been limited by the inhomogeneous density distributions in harmonic trapping potentials, where non-local quantities such as the momentum distribution can only be measured as trap-averages. Here, we present the experimental realisation of a homogeneous 2D Fermi gas trapped in a box potential, which is realized by a ring shaped blue detuned beam with steep walls. We employ matter wave focussing to measure the momentum distributions of homogeneous 2D Fermi gases in the crossover from the ideal Fermi gas to the regime of strongly interacting bosonic molecules. For a non-interacting Fermi gas, we directly observe Pauli blocking in the unity occupation of momentum states.

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