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Fermionization of two Distinguishable Fermions¹ THOMAS LOMPE, FRIEDHELM SERWANE, GERHARD ZUERN, ANDRE WENZ, MARTIN RIES, SELIM JOCHIM, University of Heidelberg — Recently, our group has demonstrated the ability to prepare few-fermion systems of in well-defined quantum states with near unity fidelity. These systems consist of 1-10 ultracold atoms confined in an optical microtrap [1]. Combined with the ability to control the interparticle interactions with Feshbach resonances this gives us a level of experimental control unavailable in any other mesoscopic quantum system. Here we report on our studies of two distinguishable fermions with resonant interactions confined in a 1-D harmonic oscillator potential. We find that for diverging coupling strength $g_{1D} \rightarrow \pm\infty$ the system undergoes a process of fermionization, similar to a 1-D Bose gas in the Tonks-Girardeau regime.

[1] F. Serwane et. al., arXiv:1101.2124v1

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