

Abstract Submitted  
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**Observation of Spin-Polarons in a tunable Fermi liquid** ANDRE SCHIROTZEK, CHENG-HSUN WU, ARIEL SOMMER, MARTIN ZWIERLEIN, MIT — We have observed Spin-Polarons, dressed spin down impurities in a spin up Fermi sea. rf spectroscopy can directly reveal the polaronic nature of the impurity particles and allows for an experimental measure of the quasiparticle residue  $Z$  and the chemical potential  $\mu$  of this novel Fermi liquid. The polarons are found to be only weakly interacting with each other, and can thus be identified with the quasi-particles of Landau's Fermi liquid theory. At a critical interaction strength, the transition to two-particle molecular binding is observed, constituting a phase transition from a Fermi liquid to a Bose liquid. Furthermore, we will give an outlook on experiments determining the effective mass  $m^*$  of the observed Spin-Polarons, another central quantity of Fermi liquid theory.

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