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Dynamics of multi-component fermions in optical lattices CHRISTOPH BECKER, JASPER SIMON KRAUSER, JANNES HEINZE, NICK FLÄSCHNER, SÖREN GÖTZE, KLAUS SENGSTOCK, Institute for Laser Physics, Luruper Chaussee 149, 22761 Hamburg, Germany, BFM TEAM — Quantum gases in optical lattices offer intriguing possibilities for quantum simulation due to the full control over lattice and interaction parameters as well as the internal atomic degrees of freedom. In our setup, we produce different interacting spinmixtures of fermionic K atoms and load them into an optical lattice. The atoms behave similar to electrons in a crystal. However, in contrast to spin-1/2 electrons, potassium possesses high spin, which has important effects on the properties of the system. We induce dynamics by quenching the system from a polarized to a nonpolarized regime and compare our experimental data to theoretical calculations. In the latter, we assume a simplified two-particle model which is in very good agreement with our observations. Extending the calculations to larger many-body system may guide the experiment to study complex fermionic lattice-systems beyond conventional spin-1/2 systems.

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