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Realization of an ultracold indium gas

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Three atom types have been responsible for nearly all the remarkable progress in quantum degenerate gas experiments, namely alkalis, alkaline earths, and dipolar lanthanides. Meanwhile main-group elements III-VIII remain unexplored in the quantum degenerate regime.

Our work focuses on ultracold indium, which is a main-group III element. Indium is a multipurpose atom that contains many useful properties found only in isolation in other ultracold atom types. For example, indium simultaneously contains magnetic Feshbach resonances, optical clock transitions, strong spin exchange interactions, spinor gas capabilities, and promising spin-orbit coupling capabilities.

We describe our realization of a laser-cooled indium gas, including a Zeeman slower, an efficient magneto-optical trap, and sub-Doppler cooling.

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