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Coherent spinor dynamics in all-optical spin-1 condensates[1]

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All-optical approaches to BEC that we have developed offer considerable flexibility and speed compared to magnetic trap approaches. Additionally, they are ideally suited to the study of spinor condensates, which are multi-component BEC's with internal spin degrees of freedom described by a vector order parameter. The delicate interplay of the different magnetic quantum gases yields a rich variety of phenomenon including Josephson oscillations and spin domain formation. I will describe our observation of coherent spin changing collisions in a spin-1 rubiudium-87 condensate, which provides convincing validation of the mean-field theoretical treatment of the system dynamics.

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