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Spin Dynamics of Spin-1 Bose Gas.

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Bose condensates with internal degrees of freedom offer a rich variety of phenomenon including Josephson oscillations and spin domain formation arising from the interactions of the different magnetic quantum states. I will describe our experiments demonstrating coherent spin changing collisions in a spin-1 rubiudium-87 condensate, which provides confirms the mean-field theoretical treatment of the dynamical evolution of the spinor. We have also investigated spin domain formation in an elongated spinor condensate. We show that domains generally form when all three Zeeman components co-exist, except when the system is close to the spinor ground state or the condensate is smaller than the minimum allowed domain size. Finally, we investigate the miscibility of different spin states and find results consistent with the ferromagnetic nature of the $F = 1$, ^{87}Rb spinor system.