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Quantum state control of a Raman-coupled spinor BEC K.C. WRIGHT, University of Rochester, Department of Physics, L.S. LESLIE, University of Rochester, Institute of Optics, N.P. BIGELOW, University of Rochester, Department of Physics — We have investigated the conditions under which it is possible to coherently prepare a BEC in a desired spinor state using a series of off-resonant Raman-detuned laser pulses. We find that over a wide range of experimental parameters it is possible to design a pulse-sequence protocol for controlling both the amplitudes and relative phases of the components of the spinor order parameter of alkali metal BECs. We apply these results specifically to ^{87}Rb in the F=2 ground hyperfine state, and compare the predictions of the theoretical model against experimental results.

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