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Spinor Bose-Einstein condensates subject to time-dependent microwave dressing: Coherent states vs. Fock states AARON FOSTER, DELARAM NEMATOLLAHI, ARNE SCHWETTMANN, University of Oklahoma, EITE TIESINGA, Joint Quantum Institute, NIST and the University of Maryland — We present calculations of the fully quantum-mechanical spin evolution for a single spatial mode of an F=1 antiferromagnetic spinor Bose-Einstein condensate in the presence of time-dependent microwave dressing. We focus on the coherent spin evolution driven by spin-exchange collisions, where two atoms with magnetic quantum number m=0 collide and change into a pair with m= +/-1. We compare and contrast population oscillations for an initial coherent spin (Glauber) state with results for an initial pure number (Fock) state. These simulations are in support of our planned experiments to create and characterize two-mode squeezing between the m= +/-1 spin projections as well as to build a nonlinear interferometer to measure phase with uncertainties that improve upon the shot-noise limit in the number of atoms in the m= +/-1 states.

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