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Orbit-nematic coupling and nematic density waves in antiferromagnetic spin-1 condensates [1] DI LAO, CHANDRA RAMAN, CARLOS SA DE MELO, Georgia Institute of Technology — We propose the creation of artificial orbit-nematic coupling in spin-1 sodium condensates via a suitably designed microwave chip that produces a spatially dependent quadratic Zeeman shift, which is parametrized by the amplitude of the constant component q and the spatially varying component Ω. We construct the phase diagram of q versus Ω and show that three quantum phases emerge. The first one is a conventional easy-axis nematic Bose-Einstein condensate, and the other two are easy-plane nematic condensates with either single-well or double-well structure in momentum space. By including spin-dependent and spin-independent interactions, we also obtain the low energy excitation spectra in these three phases. Furthermore, we demonstrate that the momentum-space single-well and double-well easy-plane nematic phases correspond, respectively, to real-space commensurate and incommensurate nematic density waves.

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