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Half-Quantum Vortex Bound States in a Rotating Two-Component Dipolar Bose Gas WILBUR SHIRLEY, Univ of Illinois - Urbana, BRANDON ANDERSON, University of Maryland College Park, CHARLES CLARK, RYAN WILSON, National Institute of Standards and Technology — We consider a rotating two-component Bose-Einstein condensate in quasi-two dimensional geometry, wherein one component exhibits dipole-dipole interactions. We model numerically the interaction potential between a half-quantized vortex (HQV) in the dipolar species and a HQV in the other species. We find that for sufficiently strong dipolar interactions a bound state between HQVs occurs as a result of rotonic features induced by the dipolar vortex. We then simulate a rapidly rotating system confined in an oblate harmonic trap and observe novel ground state vortex configurations including HQV molecules and chains of bound vortices. Finally we present a phase diagram which elucidates the effects of dipolar interactions on the planar vortex geometry.

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