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Vortex lattice locking in rotating two-component Bose-Einstein Condensates RYAN BARNETT, EDWARD CHEN, Caltech, MASON PORTER, Oxford, HANS PETER BUCHLER, Stuttgart, GIL REFAEL, Caltech — The vortex density of a rotating superfluid, divided by its particle mass, dictates a superfluid's angular velocity through the Feynman relation. To find how the Feynman relation applies to superfluid mixtures, we investigate a rotating two- component Bose Einstein condensate, composed of bosons with different masses. We find that in the case of sufficiently strong interspecies attraction, the vortex lattices of the two condensates lock and rotate at the drive frequency, while the superfluids themselves rotate at two different velocities, whose ratio is that of the particle masses of the two species. In this talk, I will characterize the vortex-locked state, establish its regime of stability, and find that it survives within a disk smaller than a critical radius, beyond which vortices become unbound. Finally, numerical solution of the coupled Gross-Pitaevskii equations in support of this will be presented.

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