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Bragg Spectroscopy of Vortex Lattices in Bose-Einstein condensates SERGIO R. MUNIZ, DEVANG S. NAIK, MISHKATUL BHATTACHARYA, CHANDRA RAMAN, Georgia Institute of Technology — We have measured the velocity field of a vortex lattice within a sodium Bose-Einstein condensate using Bragg scattering. The phase gradient of the macroscopic wavefunction was mapped into the spatial structure of the diffracted atom cloud, allowing for single shot measurement of the rotation parameters. A combination of spectral and spatial information yields a complete description of the superfluid flow, coarse-grained over the lattice structure, including direct and independent measurements of the rate and sense of rotation. Signatures of the microscopic quantum rotation have also been observed.

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