Finite-temperature vortex decay, core brightness and turbulence in atomic Bose-Einstein condensates

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We study observable vortex properties in a trapped atomic Bose-Einstein condensate. Our formalism is based on a dissipative Gross-Pitaevskii equation for the condensate coupled to a semiclassical Boltzmann equation for the thermal cloud. We report results on decay rates, precession frequencies and core brightness (which can be used to experimentally determine the temperature). We also present progress towards developing experimentally accessible methods to create and characterise turbulence in atomic Bose-Einstein condensates based on altering the path of a laser stirrer.