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Decay of hydrodynamic modes in dilute Bose-Einstein condensates[1] ERICH GUST, LINDA REICHL, Univ of Texas, Austin, Center for Complex Quantum Systems — We present the results of Bogoliubov mean field theory [1] applied to the hydrodynamic modes in a dilute Bose-Einstein condensate. The condensate has six hydrodynamic modes, two of which are decaying shear modes related to the viscosity, and two pairs pairs of sound modes which undergo an avoided crossing as the equilibrium temperature is varied [2]. The two pairs of sound modes decay at very different rates, except in the neighborhood of the avoided crossing, where the identity of the longest-lived mode switches. The predicted speed and lifetime of the longest-lived sound mode are consistent with recent experimental observations on sound in an ^{87}Rb Bose-Einstein condensate. The strong depedence of the decay rates on temperature implies a possible new method for determining the temperature of Bose-Einstein condensates. [1] L. E. Reichl and Erich D. Gust, Phys. Rev. A 88, 053603 (2013) [2] Erich D. Gust and L. E. Reichl, Phys. Rev. A 90, 043615 (2014)

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