# Damping of Mechanical Oscillators During the Turbulent Transition in $^4$He

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We present our most recent findings on the transition to turbulence in both normal and superfluid $^4$He, including pure quantum turbulence at very low temperatures. We have studied the transition to both classical and quantum turbulence using quartz tuning forks, double-paddle and micro-mechanical goalpost structures[1]. We investigate the differences between the transition to classical turbulence in normal He as well as the transition to quantum turbulence in the superfluid phase. We discuss the changing characteristics of the dependence of the drag coefficient as a function of velocity with varying normal fluid and superfluid fractions. The oscillators' non-linear behaviour at high velocities was measured and compared to models of the non-linear drag force.[2]

1. E. Collin, Y.M. Bunkov and H. Godfrin, Phys. Rev. B **82**, 235416 (2010)
2. E. Zemma and J. Luzuriaga, J. Low Temp. Phys. **172**(3/4), (2013) In Press