Abstract Submitted
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Heatless Motive Force for Producing Grid Turbulence in Liquid Helium near Absolute Zero[1] GARY IHAS, KYLE THOMPSON, ROMAN CHAPURIN, University of Florida, LYDIA MUNDAY, Lancaster University, GREG LABBE, University of Florida, PETER MCCLINTOCK, Lancaster University — Flow through a grid is a standard method to produce isotropic, homogeneous turbulence for laboratory study. This technique has been used to generate quantum turbulence (QT) above 1 K in superfluid helium,[2] where QT seems to mimic classical turbulence. Efforts have been made recently[3] to make similar measurements near absolute zero, where there is an almost total absence of normal fluid and hence classical viscosity. This presents the difficulty that most motive force devices produce heat which overwhelms the phenomena being investigated. The process of designing and implementing a "dissipation-free" motor for pulling a grid through superfluid helium at millikelvin temperatures has resulted in the development of new techniques which have broad application in low temperature research. Some of these, such as Meissner-effect magnetic drives, capacitive and inductive position sensors, and magnetic centering devices (bearings) will be described.

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