Abstract Submitted
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Dissipative superfluid mass flux through solid ^{4}He[1] YEGOR VEKHOV, ROBERT HALLOCK, Dept. of Physics, Univ. of Mass. Amherst — The thermo-mechanical effect in superfluid helium is used to create a chemical potential difference, $\Delta\mu$, across a liquid or solid ^{4}He sample and induce a mass flux. With an improved technique, measurements of the mass flux, F, through a solid-filled sample cell at several fixed helium sample temperatures, T, have been done as a function of $\Delta\mu$. And, measurements of F (in the range $100 < T < 550$ mK) have been done as a function of temperature for several fixed values of $\Delta\mu$. The temperature dependence of the flow through solid helium above 100 mK is confirmed to show a reduction of the flux with increasing temperature, while for liquid helium there is no marked temperature dependence in the temperature range studied. The dependence of F on $\Delta\mu$ documents in some detail the dissipative nature of the flow for the case of a solid helium- filled sample cell. In the case of solid helium we observe $F \sim \Delta\mu^b$ with $b \approx 0.3$, which is consistent with expectations for 1D superfluidity. The relationship between this work and the various torsional oscillator NCRI results is not clear. We may be exploring different phenomena.

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