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Thermal Conductivity Measurements of Helium 4 Near the λ-Transition Using a Magnetostrictive Low Gravity Simulator MELORA LARSON, ULF E. ISRAELSSON, *Jet Propulsion Laboratory,* California *Institute of Technology* - There has been a recent increase in interest both experimentally and theoretically in the study of liquid helium very near the A-transition in the presence of a heat current. In traditional ground based experiments the arc gravitationally induced pressure variations in any macroscopic helium sample that limit how closely the transition can be approached. We have taken advantage of the finite magnetic susceptibility of ^4He to build a magnetostrictive low gravity simulator. The simulator consists of a superconducting magnet with magnetic field profile shaped to counteract the force of gravity in a helium sample. When the magnet is operated with $B \times \partial B/\partial z = 21T^2/cm$ at the location of the cell, the gravitationally induced pressure variations will be cancelled to within 1 % over a volume $0.5cm$ in height and $0.5cm$ in diameter. This technique for cancelling the pressure variations in a long sample cell allows the λ-transition to be studied much closer in reduced temperature and under a wider range of applied heat currents than is possible using other ground based techniques. Preliminary results using this low gravity simulator and the limitations of the magnetostrictive technique in comparison to doing space based experiments will be presented.

[X] Prefer Oral Session
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