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Thermodynamic and transport properties along Jupiter's adiabat MARTIN FRENCH, Sandia National Laboratories, ANDREAS BECKER, WIN-FRIED LORENZEN, University of Rostock, NADINE NETTELMANN, University of California, Santa Cruz, MANDY BETHKENHAGEN, University of Rostock, JO-HANNES WICHT, Max Planck Institute for Solar System Research, Katlenburg-Lindau, THOMAS MATTSSON, Sandia National Laboratories, RONALD RED-MER, University of Rostock — Accurate knowledge about the behavior of the major constituents, hydrogen and helium, is required to model and understand the interior of Jupiter. Transport properties like the thermal and electrical conductivity as well as the viscosity are particularly interesting to examine, since their behavior changes drastically at the transition from the dense nonideal plasma to the molecular fluid. Here we use *ab initio* molecular dynamics simulations based on density functional theory to calculate equilibrium and transport properties of the warm dense H-He mixture. In particular, we present results [1] for thermodynamic material properties, the shear and longitudinal viscosity, the electrical and the thermal conductivity in hydrogen-helium mixtures along the isentrope of Jupiter, Our results cover the range from the outer molecular regions (2000 K, 5 kbar) to the core-mantle boundary (19000 K, 40 Mbar). These new data will lead, e.g., to significant improvements in understanding the origin and shape of the magnetic field of Jupiter.

 M. French, A. Becker, W. Lorenzen, N. Nettelmann, M. Bethkenhagen, J. Wicht, R. Redmer, Astrophys. J. Suppl. Ser. 202, 5 (2012).

> Martin French Sandia National Laboratories

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