Unusual transport properties in the orbitally-ordered system Lu$_2$V$_2$O$_7$ H.D. ZHOU, B. CONNER, B.W. VOGT, C.R. WIEBE, L.L. LUMATA, J.S. BROOKS, Department of Physics and National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32306-3016, USA, E.S. CHOI, Y. XIN, National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32306, USA — DC susceptibility ($\chi$), AC and DC resistivity ($\rho$), specific heat ($C_p$), and thermoconductivity ($k$) measurements on single crystalline Lu$_2$V$_2$O$_7$ with the pyrochlore structure reveal two transitions: (1) a short-range magnetic ordering transition at $T_s = 175$ K, which is identified by the slope change of $1/\chi$ and $1/k$, an anomaly in the AC resistivity, and a change in the activation energy (2) an orbital ordering transition at $T_o = 70$ K, which is confirmed by the sharp transition on $\chi$, $k$, and $C_p$. At $T_o$, the resistivity shows an unusual insulator-metal transition which will be discussed in relation to the orbital ordering transition.

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