Abstract Submitted
for the FWS17 Meeting of
The American Physical Society

Analysis of the temperature-dependent specific heat of $Pr_{1-x}Nd_xOs_4Sb_{12}$[1] SHOJI HISHIDA, JESUS VELASQUEZ, TAYLOR MCCULLOUGH-HUNTER, PEI-CHUN HO, Physics, California State University, Fresno, BRIAN MAPLE, Physics, UC San Diego, TATSUYA YANAGISAWA, Physics, Hokkaido University, Japan — The compounds $PrOs_4Sb_{12}$ and $NdOs_4Sb_{12}$ have attracted interest due to their properties at low temperatures, where they exhibit unconventional heavy-fermion superconductivity and ferromagnetism respectively. The series of compounds $Pr_{1-x}Nd_xOs_4Sb_{12}$ is being studied in order to understand the interaction between these effects. Previous studies have shown that there is competition between the superconducting and ferromagnetic effects and that for particular concentrations of Nd and Pr, the two phenomena coexist within the sample. In order to understand this system, the specific heat was measured in the normal state from 10 300 K. Thermodynamic parameters were extracted from the specific heat data for each sample, including the Debye Temperature, Einstein Temperature, and electronic specific heat coefficient. These provide information about the properties of the lattice and conduction electrons. The Einstein and Debye temperatures were both found to have a minimum around $x = 0.55$, which suggests a form of lattice-softening taking place at the Nd concentration where the superconductivity disappears and a possible quantum critical point may occur.

[1]Research at CSU-Fresno is supported by NSF DMR-1506677; at UCSD by NSF DMR-1206553 and US DOE DEFG02-04ER46105; at Hokkaido Univ. by JSPS KAKENHI grants nos. 26400342, 15K05882, and 15K21732.

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Date submitted: 29 Sep 2017 Electronic form version 1.4