Transport, magnetic and thermal properties of \( M \text{FePO} \) \( M = \text{La, Pr, and Nd} \) single crystals\(^1\) RYAN BAUMBACH, JAMES HAMLIN, LEI SHU, DIEGO ZOCCO, NICOLE CRISOSTO\(^2\), M. BRIAN MAPLE, Department of Physics and IPAPS, University of California, San Diego — The recent discovery of \( T_c \) values near 26 K in the compound \( \text{LaFeAsO}_{1-x}\text{F}_x \) induced a torrent of publications on what are now recognized as a new class of Fe-based high temperature superconductors. To date, the phosphorus based versions of these compounds have received little attention due to their comparatively low \( T_c \) values. In this work we report the low temperature electrical resistivity, magnetic susceptibility, and specific heat data of single crystalline PrFePO and NdFePO. We also report the effect of annealing on the properties of LaFePO, PrFePO, and NdFePO. A systematic comparison of the occurrence of superconductivity in the series \( M \text{FePO} \) and \( M \text{FeAsO} \) (where \( M \) is a lanthenide) points to a possible difference in the origin of the superconductivity in these two series of compounds.

\(^1\)This research was sponsored by the U.S. Department of Energy (DOE) under Research Grant \# DE-FG02-04ER46105 and Research Grant \# DE FG02-04ER46178 and by the National Science Foundation (NSF) under Grant \# DMR0802478.

\(^2\)Student was a participant in the Research Experience for Undergraduates (REU) program at UCSD

Ryan Baumbach

Department of Physics and IPAPS, University of California, San Diego