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Band dependent magneto thermoelectric measurements on $Ca_3Ru_2O_7$ HUI XING, Shanghai Jiao Tong University, CHENYI SHEN, Zhejiang University, LIBIN WEN, JIAMING HE, SHUN WANG, Shanghai Jiao Tong University, JIN PENG, JIANJIAN GE, Tulane University, YOUMING ZOU, MINGLIANG TIAN, High Magnetic Field Laboratory, Chinese Academy of Sciences, ZHUAN XU, Zhejiang University, ZHIQIANG MAO, Tulane University, YING LIU, Pennsylvania State University, Shanghai Jiao Tong University — $Ca_3Ru_2O_7$ features a Neel transition at 56 K followed by a structure and metal-insulator transition at 48 K as the temperature is lowered, suggesting a complex structure-property relationship driven by electron correlated effects. However, the electronic states of $Ca_3Ru_2O_7$ are not understood. ARPES measurements revealed the presence of an electron Fermi arc, while the expected hole Fermi arc is missing. Quantum oscillations showed the existence of a small Fermi surface, but the details of the Fermi surface, including whether the hole Fermi arc is present, are not determined. We performed band-dependent thermoelectric measurement with the temperature gradient directed to a specific crystalline axis. Magneto thermopower along crystalline a and b axes, S_a and S_b, both of which are negative in sign and nearly identical at high temperatures, were found to behave markedly differently below the metal-insulator transition, with S_b changing its sign from being negative to positive. Our analysis suggests that S_a and S_b in $Ca_3Ru_2O_7$ are dominated by the electron and hole Fermi arcs, respectively. The implications of our data on the physics of $Ca_3Ru_2O_7$ will be discussed.

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