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**Complex magnetic fluctuations and their consequences in bilayer ruthenate $Ca_3Ru_2O_7$ probed by $k$-dependent magneto thermoelectric measurements** HUI XING, LIBIN WEN, JIAMING HE, SHUN WANG, Shanghai Jiao Tong University, CHENYI SHEN, Zhejiang University, JIN PENG, JIAN-JIAN GE, Tulane University, MINGLIAN TIAN, High Magnetic Field Laboratory, Chinese Academy of Sciences, ZHUAN XU, Zhejiang University, ZHIQIANG MAO, Tulane University, WEI KU, Shanghai Jiao Tong University, YING LIU, Pennsylvania State University, Shanghai Jiao Tong University — The bilayer ruthenate $Ca_3Ru_2O_7$ is among the most interesting 4d and 5d transition metal oxides, featuring a complex structure-property relation as well as correlated effects, especially those originating from magnetic fluctuations. The underlying electronic states and the transport mechanism, especially that below the metal-nonmetal transition, highlighted by the emergence of a coherent state at low temperature, remains to be understood. Here we provide evidence from our magneto transport and thermoelectric transport measurements that two Fermi pockets with opposite carriers dominate the transport property at low temperatures, with the electron pocket prevailing due to the increased electron mean free path. We find a strong energy dependence of the conductance on at least the dominating Fermi surfaces, pointing to a significant carrier scattering due to magnetic fluctuation in this system. This mechanism is further corroborated by the anisotropic magnetoresistance in the AFM-b magnetic phase, where the application of an external magnetic field will enhance or depress the magnetic fluctuations depending on the magnetic field orientation.

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