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Two-particle current from Superfluid Fermi Gases in the BCS-BEC Crossover EMIKO ARAHATA, Department of Basic Science, The University of Tokyo, TETSURO NIKUNI, Department of Physics, Faculty of Science, Tokyo University of Science — In recent years, the crossover from the BCS-type superfluid to the Bose-Einstein condensation (BEC) of tightly-bound molecules has been realized in ultracold atomic Fermi gases using a tunable pairing interaction associated with a Feshbach resonance. In the BCS-BEC crossover it will be important to reveal the nature of fermion pairs. In this paper, we propose that two-particle (double photoemission) current (DPE current) is a powerful technique to provide direct insight into the pair-correlations. The DPE from superconductors has been studied both theoretically and experimentally, where a pair of electrons is emitted from the system upon the absorption of one photon. In this study, we consider an analogous situation in ultracold atomic gases, and derive a general expression for DPE current from superfluid Fermi gases in the BCS-BEC crossover. We show DPE current as a function of energy and momentum transfers, and identify the contributions of the condensed pair components and uncorrelated pair states, and discuss the possibility of distinguishing between weakly-bound Cooper pairs and tightly-bound molecules.

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