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Microwave Conductivity Spectroscopy for Fe(Se,Te) Thin Films[1]
FUYUKI NABESHIMA, KOSUKE NAGASAWA, DAISUKE ASAMI, YUICHI SAWADA, YOSHINORI IMAI, ATSUTAKA MAEDA, University of Tokyo — Iron chalcogenide superconductors Fe(Se,Te) have very small ϵ_F and are considered to be in the BCS-BEC crossover regime[1]. Since Ginzburg number, $G_i = (k_B T_c/\epsilon_F)^4$, which is the relative temperature width of the superconducting fluctuation region, is large for materials in the BCS-BEC crossover regime, large superconducting fluctuations are expected in Fe(Se,Te). In order to investigate superconducting fluctuations in these materials we have performed microwave conductivity spectroscopy on Fe(Se,Te) thin films. Superfluid density of an Fe(Se,Te) film with T_c^{zero}=17 K[2] took finite values above 25 K. This temperature is much higher than T_c estimated by the dc measurement, suggesting strong superconducting fluctuations in Fe(Se,Te). A dynamic scaling analysis of complex fluctuation conductivity revealed that the superconducting fluctuations of Fe(Se,Te) exhibit a 2-dimensional behavior, while BKT transition was not observed. We will also report on the thickness dependence and the Te content dependence of the superconducting fluctuation. [1] Y. Lubashevsky *et al.*, Nat. Phys. **8** (2012) 309. [2] Y. Imai *et al.*, PNAS **112** (2015) 1937.

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