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Superfluid and quasiparticle behavior below Tc of strain introduced high-quality epitaxial thin films of Fe(Se,Te)[1] ATSUTAKA MAEDA, FUYUKI NABESHIMA, YOSHNORI IMAI, Department of Basic Sciences, University of Tokyo, MASAFUMI HANAWA, ATARU ICHINOSE, ICHIRO TSUKADA, Central Research Institute of Electric Power Industry — We succeeded in introducing compressive strain in epitaxial films of FeSe and Fe(Te,Se), leading to high Tcs' (1.5 times higher that in bulk crystals for FeSe)[1]. It is of great interest how the effect of strain shows up in properties in the superconducting state of these thin-film samples. We investigated superfluid- and quaiparticle response at THz frequencies. Structures characteristic of superconductivity was found clearly both in real part and imaginary part of the conductivity spectrum. Increase of quasiparticle scattering time below Tc was observed even in THz frequencies, which is connected with microwave data measured in bulk crystals consistently. Even in these high-quality, high Tc films, development of superfluid density with decreasing temperature is rather gradual, keeping a "dirty" feature. This might be related to possible excess Fe characteristic of this material, and further improvement of Tc is expected by additional heat treatment. Alternatively, the contribution of Legget mode is also considered. At present, any anomalous features related to strain have not been observed in these properties. The data at microwave frequencies taken by a dielectric resonator will also be discussed.

[1] F. Nabeshima et al.: APL 103 (2013) 172602.

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