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Title:Continuous Tera-Hertz wave transmission spectroscopy of Nb double superconducting split-ring resonator array

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Abstract:Transmission spectroscopy of two Nb double superconducting split-ring samples with different thicknesses on MgO substrates was measured by a continuous Tera-Hertz spectrometer. The transmission curves of two different samples with the thicknesses of 50 and 150 nm at 7.5 K show dips at 480, 545 GHz, respectively, which origin from the different capacities and inductances of the samples. For the sample of 50 nm, the dip shifts to lower frequency, also decreases in depth and increases in width with temperature or field increasing below T<inf>c</inf> of Nb film, while the sample of 150 nm does not show such a phenomenon. This thickness-dependent transmission behavior is due to the kinetic inductance and conductivity change of superfluid electrons in Nb film and may suggest a practical tunable THz filter based on the thinner samples. © Science China Press and Springer-Verlag Berlin Heidelberg 2012.

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