A link between superconducting transition and optical range plasmonics of niobium

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Superconductivity is commonly expected to be insignificant in optics, where photon energy is orders of magnitude higher than the binding energy of the Cooper pairs, the superconducting charge carriers. By studying optical range plasmonic response of niobium, a conventional low-temperature superconductor, we show that, contrary to this expectation, superconductivity does affect plasmonic behaviour at optical frequencies. Our results shed a new light on properties of superconductors, suggesting that superconductivity may play a role in forming the optical dielectric response near the superconducting transition.