



Electron-phonon interaction in SrTiO₃

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Strontium titanate is a unique material which exhibits interesting features which are not encountered in conventional polar crystals at the same conditions. It becomes a superconductor at unusually low carrier densities. This gives one a reason to call SrTiO₃ “the most dilute superconductor”. SrTiO₃ is probably the only substance where superconductivity and optical absorption can be convincingly attributed to the Fröhlich-like electron-phonon interaction and polarons.

In the present talk, a review of manifestations of the electron-phonon coupling in strontium titanate is given. We are particularly focused on our recent theoretical studies of the many-polaron optical conductivity of doped SrTiO₃ and superconductivity in bulk strontium titanate and SrTiO₃-based planar structures, with a comparative discussion of different theoretical interpretations of the optical response and superconductivity in SrTiO₃.