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Forward scattering from phonons as a pathway to increasing T_c in quasi-two-dimensional unconventional superconductors

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One of the primary goals of superconductivity research is engineering materials that become superconducting at high temperatures. To this end, I will examine forward scattering from phonons as a general means to increase T_c in unconventional superconductors. First I will introduce the mechanisms for generating electron-lattice interactions in quasi-two-dimensional correlated systems that are peaked in the forward scattering direction. Then I will present case studies comparing theory to angle-resolved photoemission spectroscopy data for the Bi-family of cuprate superconductors [S. Johnston *et al.*, PRL **108**, 166404 (2012)] and the recently discovered FeSe monolayer in SrTiO₃ substrates [J. J. Lee *et al.*, Nature **515**, 245 (2014)]. These studies demonstrate the general principle of using particular electron-phonon interactions for enhancing superconductivity in unconventional pairing channels.