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Polaron formation and multi-band multi-gap superconductivity in layered materials ANNETTE BUSSMANN-HOLDER, Max-Planck-Institute for Solid State Research, HUGO KELLER, Physik Institut der Universität Zürich — In cuprates and novel layered superconductors electron-lattice interactions are not strong enough to achieve the high transition temperatures. However, polaron formation may occur locally at intermediate sized regions around the dopants thus leaving the surrounding matrix remains almost unaffected. The coexistence of the dynamical polarons and the host matrix represents a multi-component system, where different physics are combined. The consequences of this scenario are manifold: The strong *local* electron-lattice coupling induces a *local soft mode* which gives rise to divergences in the relative Cu-O, Fe-As squared displacements. The electronic bands are renormalized and experience an exponential reduction which is the origin of unconventional isotope effects. Superconductivity is characterized by multi-components, which can have system dependent different pairing symmetries. Cuprates and other layered superconductors are discussed and comparison to experimental data is made.

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