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**Strong Coupling Polaron in 2D in Terms of the Bethe-Salpeter Equation** RUSSELL SELVA, YURIY MALOZOVSKY, Southeastern Louisiana University — We consider the formation of polaron in two dimensions in terms of the Bethe-Salpeter equation. We develop the perturbation diagram approach to the electron-phonon interaction problem and show that the series of the ladder diagrams lead to the well-known Bethe-Salpeter equation. We evaluate the self-energy of the polaron. We show that even in the case of the weak electron-phonon interaction there at least one bound state exists for the polaron in two dimensions. We consider the formation of the polaron for the interaction of an electron both with acoustic and optical phonons. We have found the existence of the strong coupling polaron in both cases.

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