Polariton at the boundary of 2D and 1D-materials: Existence of a distinct class of non-perturbative solutions of coupled Dyson equations SLAVA V ROTKIN, Lehigh University, Department of Physics, Department of Materials Science and Engineering, ALEXEY G. PETROV, Ioffe Institute — The Hamiltonian of two strongly-coupled fields in spaces of different dimensions is revisited. Starting with the formalism of coupled Dyson equations, a distinct family of non-perturbative solutions is derived. Such a (quasi-localized) solution appears at the dimensional boundary (aka interface). In case the fields are harmonic, an analytical solution is found for hybrid modes. This general approach can be applied to a wide range of quantum-mechanical problems. An explicit example of a hybrid plasmonic mode for coupled 2d-(graphene) and 1d-(nanowire) system is given.

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