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Dynamical polarizability of the pseudospin-1 dice lattice

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The two-dimensional dice lattice is the pseudospin-1 analogue the pseudospin-1/2 Dirac material graphene. The dice-lattice low-energy excitation spectrum consists of the Dirac cone dispersion found also in graphene, with an additional dispersionless flat band intersecting the Dirac point. We present theoretical results for the electronic dynamical polarization function in the material. This fundamental entity in many-body physics renormalizes the Coulomb interaction by accounting for the screening of charges. From the polarizability, many interesting phenomena can be described, such as plasmonic excitations or Friedel oscillations. The flat band in the dice lattice provides distinct alteration of the typical physics seen in graphene.

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