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Carrier Scattering in Decorated Transition Metal Dichalcogenide Monolayers[1] DIANA MENESES GUSTIN, Universidade Federal de Sao Carlos, SERGIO ULLOA, Ohio University, VICTOR LOPEZ, Universidade Federal de Sao Carlos — The modification of electronic properties of 2D crystals by adsorption of molecules, such as deposition of photosensitive azobenzene on MoS2 monolayers, has been recently achieved [1]. Azobenzene modifies the electronic structure, which may be described by local charge transfer and strain fields. These potentials produce carrier scattering processes that may be described in terms of scattering phase shifts and corresponding cross sections. A comparison of Schrodinger and massive Dirac formulations for such problem are found to provide interesting insights in two asymptotic regimes. At low energies, where both dispersions can be seen as parabolic bands, the process is dominated by low angular momentum channels which exhibit different wave number dependence, and yet result in nearly isotropic scattering amplitudes. On the other hand, the differential cross section at high energies has clear signatures of the different band dispersions, with anisotropic behavior and different energy dependence in the Dirac or Schrodinger problem. The understanding of the electronic dynamics in these systems hold the promise for successful design of structures with desired functionality, as we exemplify by presenting differential cross sections for different types of scattering potentials.

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