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Sub-MeV dark matter detection with 2D materials

Light dark matter search has emerged as the latest frontier in the direct detection experiments. Small kinetic energy of sub-MeV mass dark matter requires novel target materials and techniques for detection. 2D materials like bilayer graphene with small energy gap could be useful in this regard. Its voltage-tunable sub-eV band gap makes it a promising candidate for a sub-MeV dark matter search experiment. In this talk, I will describe how to calculate dark matter scattering rate with electrons in bilayer graphene and show its sensitivity projection in future experiments. I will also show the relatively large daily modulation in the scattering rate that stems from the rotation of the earth about its axis and the anisotropic response of bilayer graphene. This signal modulation will help reject the background events in such an experiment.

Field of contribution

Theory

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