Phenomenology 2020 Symposium



Contribution ID: 1010

Type: Parallel Talk

Multiphonon excitations from dark matter scattering in crystals

Monday 4 May 2020 17:00 (15 minutes)

For direct detection of sub-MeV dark matter, a promising strategy is to search for individual phonon excitations in a crystal. We perform an analytic calculation of the rate for light dark matter (keV < mDM < MeV) to produce two acoustic phonons through scattering in cubic crystals such as GaAs, Ge, Si and diamond. The multiphonon rate is always smaller than the rate to produce a single optical phonon, whenever the latter is kinematically accessible. In Si and diamond there is a dark matter mass range for which multiphonon production can be the most promising process, depending on the experimental threshold.

Summary

We perform analytic calculations of the effect of higher-order multiphonon contributions to scattering rates for light DM scattering in crystals

Authors: CAMPBELL-DEEM, Brian (University of California, San Diego); COX, Peter; KNAPEN, Simon (CERN); Prof. MELIA, Tom (Kavli IPMU); LIN, Tongyan

Presenter: CAMPBELL-DEEM, Brian (University of California, San Diego)

Session Classification: DM II

Track Classification: Dark Matter