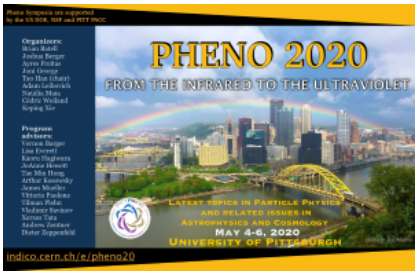

Contribution ID: **1057** Type: **Parallel Talk**

Detecting keV-range super-light dark matter using graphene Josephson junction

Monday 4 May 2020 16:30 (15 minutes)

We propose a new dark matter detection strategy that will enable the search of super-light dark matter $m_\chi \simeq 0.1$ keV, representing an improvement of the minimum detectable mass by more than three order of magnitude over the ongoing experiments. This is possible by integrating intimately the target material, π-bond electrons in graphene, into a Josephson junction to achieve a high sensitivity detector that can resolve a small energy exchange from dark matter as low as ~ 0.1 meV. We investigate detection prospects with mg-scale and g-scale detectors by calculating the scattering rate between dark matter and the free electrons confined in two-dimensional graphene with Pauli blocking factors included. We find not only that the proposed detector can serve as a complementary probe of super-light dark matter but also achieve higher experimental sensitivities than other proposed experiments, i.e. in having a low detectable threshold provided the same target mass, thanks to the extremely low energy threshold of our Josephson junction sensor.

Summary

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