

Dark Matter Interactions in Condensed Matter Systems

Wednesday, April 7, 2021 4:00 PM (1 hour)

As the gravitational evidence accumulates inexorably that dark matter comprises the vast majority of the mass of the universe, the particle nature of dark matter remains a mystery. New laboratory experiments are being commissioned to probe dark matter lighter than the proton mass, but the signature of dark matter in these detectors relies crucially on the condensed matter properties of the detector material. I will present several examples of a new approach, inspired by tools from condensed matter physics, to determine the sensitivity of a given experiment to dark matter which fully accounts for the collective modes and many-body effects present in any real material. This approach helps to identify the novel condensed matter systems with optimal material properties for dark matter detection, bridging high- and low-energy physics and ensuring that no stone is left unturned in the hunt for dark matter in the laboratory.

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Meeting ID: 978 1720 7513

Passcode: HEP_Joint

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