

PRISMA+ Colloquium

Oct. 25, 2017 at 1 p.m.
Lorentz-Raum 05-127, Staudingerweg 7

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BDX: light dark matter search in a Beam Dump eXperiment

Many astrophysical observations as well as anomalies in processes involving electromagnetic currents (e.g. the muon anomalous magnetic moment) could be reconciled assuming the existence of a new kind of matter, not directly interacting with light, called Dark Matter (DM). While gravitational effects of DM are quite well established, despite the tremendous efforts being devoted to reveal the nature of DM in terms of new elementary particles, no clear results have been obtained so far. Many experimental efforts are dedicated to direct detection of galactic DM, as well as to study the indirect effects of its presence. Due to the lack of results by 'traditional' DM searches, in the last few years the experimental activity extended to search for hints of DM produced at accelerators. Technological advances allow nowadays running high intensity electron beams of moderate energy well suited for these studies. According to some theories beyond the Standard Model (SM) Light Dark Matter (LDM) (1-1000 MeV) can interact with SM matter via a new force, mediated by a heavy vector boson called A' or 'heavy photon'. Depending on the relative masses of the A' and the DM particles, the A' can decay to SM particles ('visible' decay) and/or to light DM states ('invisible' decay).

In this talk, I will present a novel experiment called BDX (Beam Dump eXperiment) aiming to reveal dark matter particles produced in the interaction of an intense electron beam with the beam dump. The experimental technique as well as the expected reach will be reviewed and discussed.