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Dark Sector searches at the intensity frontier

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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 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 contribution, I will give an overview of the current LDM physics, focusing on experiments using high intensity electron and positron beams proposed to run in the next years at Jefferson Lab.

Submitted on behalf of a Collaboration?

Yes

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