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Search for Dark Photons via Visible Decays at Fixed-Target Experiments

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We present dark photon searches via the visible decay mode at fixed-target experiments such as DarkSHINE and MUonE.
In DarkSHINE, dark photons are produced through electron bremsstrahlung and they can be identified via displaced vertex signatures from decayed lepton pairs. Detailed studies with full vertex reconstruction are required to enable strong background suppression.
We also explore applications to muon beam experiments like MUonE, which offer complementary production channels and sensitivity to muon-philic dark sector scenarios.
These efforts highlight the potential of combining electron and muon fixed-target programs to further explore dark sector physics.

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