

Benchmarking Proton Bremsstrahlung for Dark Sector Production

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Proton beams at high luminosity colliders and fixed-target facilities offer remarkable sensitivity to new light weakly coupled degrees of freedom in the dark sector. In a recent study, we revisited the production of dark photons and dark scalars via proton bremsstrahlung for a range of beam energies, including those relevant to the proposed Forward Physics Facility (FPF) at the High Luminosity LHC. In this talk I will present some new results from work in progress, assessing the effectiveness of current methods for calculating the proton bremsstrahlung rate by comparing and benchmarking the bremsstrahlung distribution with very forward particle production rates within the SM. In the case of the vector portal, we analyze and compare the bremsstrahlung spectrum with data on the inclusive forward production of neutral vector mesons.

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