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Prospects for an LLP search in a CMS Forward Spectrometer

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We are developing a proposal to search for neutral particles with masses up to a few GeV, produced at $\eta = 6 - 7$, penetrating 42m of steel and decaying in a large diameter 27m-long vacuum pipe. This would be a new subsystem for CMS in Run 4 with high luminosity. There is sensitivity to lifetimes in the range $\gamma.c.\tau$ from about 10m to several km. Decays to lepton pairs (including $\tau + \tau^-$) and hadrons (including $c\bar{c}$) can be measured in a 10m-long spectrometer (Forward Multiparticle Spectrometer, FMS) with tracking, calorimetry and muon chambers using CMS endcap Upgrade technology. The FMS can also measure multi-TeV charged hadron spectra in low pileup runs.

Presenter: ALBROW, Michael (Fermi National Accelerator Lab. (US))

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