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Detecting long-lived particles trapped in detector material at the LHC

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We propose a two-stage strategy to search for new long-lived particles that could be produced at the CERN LHC, become trapped in detector material, and decay later. In the first stage, metal rods are exposed to LHC collisions in an experimental cavern. In the second stage, they are immersed in liquid argon at a different location, where out-of-time decays could be detected. Using a benchmark of pair-produced long-lived gluinos, we show that this experiment would have unique sensitivity to gluino-neutralino mass splittings down to 3 GeV, in previously uncovered lifetimes of days to years.

In-person participation

Yes

Primary authors: KISH, Alexander (University of Hawaii); KIESELER, Jan (DESY); ALIMENA, Juliette; SIMMS, Jasmine (The University of Oxford); PIERINI, Maurizio (CERN); AARRESTAD, Thea (Institute for Particle Physics and Astrophysics)

Presenter: ALIMENA, Juliette

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