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Light dark states with electromagnetic form factors

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There may exist new sub-GeV particles, χ , which are electrically neutral but couple to the electromagnetic current via higher-dimensional operators. This talk focus on the possible detection of light state coupled to the photon through magnetic- and electric-dipole moments, or carrying an anapole moment or charge radius. New constraints, as well as future sensitivities, on the existence of such states are derived from a number of high-intensity experiments and other collider observations, since no positive signals have been found. The second half of the talk discusses the possibility that χ is dark matter (or very long-lived) and study ensuing astrophysical and cosmological constraints, and shows that a combination of all considered probes rule out χ particles with dimensional five and six operators as dark matter when assuming a standard freeze-out abundance.

Summary

Primary authors: CHU, Xiaoyong (Institute of High Energy Physics, Vienna); PRADLER, Josef; SEMMER-LOCK, Lukas

Presenter: CHU, Xiaoyong (Institute of High Energy Physics, Vienna)

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