

Status and Update on Results of the NA64 experiment at CERN

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on behalf of the NA64 collaboration

The NA64 experiment at CERN searches for dark matter produced in both visible and invisible decays of sub-GeV vector mediators, such as the dark photon A' . During the years 2016 –2022, A' production from electrons impinging on a target Z via the reaction $e^- Z \rightarrow e^- Z A'$ and subsequent decays $A' \rightarrow \chi\chi$, χ being a dark matter particle, and $A' \rightarrow e^+ e^-$ was studied with the help of an active beam-dump experiment using the CERN H4 100 GeV/c tertiary electron beam. The invisible mode data set comprises about 10^{12} electrons on target with which NA64 probes for the first time the well-motivated region of parameter space of benchmark thermal scalar and fermionic dark matter models. The new analysis includes furthermore resonant annihilation of secondary positrons stemming from showers in the target, which boost the signal yield in the high mass region. We present the latest findings together with an update on future plans with muon beams, aiming to search for a light Z' vector boson coupled to the second and third lepton generations through the $L_\mu - L_\tau$ current in the reaction $\mu N \rightarrow \mu N Z'$, for which first data has been already taken.

Parallel Session

Fundamental Symmetries / New Physics Searches

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