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First results from the NA64 experiment using a high energy muon beam

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The quest for feebly or weakly interacting particles (FIPs) arising in low-scale New Physics (NP) scenarios is a very active topic. NA64 is a world-reference fixed target experiment at CERN searching for FIPs in the scattering of electron, positron and muons on a target. Several and well-motivated NP scenarios suggest FIPs particles preferably coupled to muons as: Z' bosons in $L_\mu - L_\tau$ models as one of the remaining explanation of the $g-2$ anomaly and the DM puzzle; Dark Photons as a portal to DM with masses above 300 MeV which are neither accessible with electron or positron beams; FIPs can also mediate Lepton Flavour Violation (LFV) processes such as $\mu N \rightarrow \tau X$ or $\mu N \rightarrow e X$ conversion processes and many more as scalar, ALPs, millicharged particles,... The goal of NA64 μ is to search for FIPs using the unique high energy and high intensity muon beam at CERN SPS. In this talk, I will describe the first published results recently using 1.98×10^{10} muons on target and the future prospects of the experiment.

Abstract

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