## **EPS-HEP2023** conference



Contribution ID: 403

Type: Poster

## Sensitivity for new light, long-lived flavor-changing scalar bosons at DUNE and NA64mu

Neutrino-oscillations motivate the search for new beyond-the-Standard-Model particles that might manifest as light scalar bosons mediating lepton-flavor-changing (LFC) interactions. In a certain class of theories, the light scalar boson could be produced at accelerator neutrino beams [1], where a high-intensity, high-energy muon flux is expected. An example of such a facility is the Deep Underground Neutrino Experiment (DUNE) using the high-power proton beam at LBNF. If such a particle exists, it could be produced after the DUNE LBNF beam target. If it is long-lived, it could travel a few hundred meters, and it could be detected at the DUNE Liquid Argon Near Detector. In parallel, the existence of such a new LFC scalar boson can also be tested using the 160-GeV muon beam at the fixed target NA64mu experiment at CERN [2], in a complementary way. In this talk, light long-lived LFC boson signatures and projected sensitivities at DUNE and NA64mu will be presented.

[1] Ema, Y., Liu, Z., Lyu, KF. et al. Flavor-changing light bosons with accidental longevity. J. High Energ. Phys. 2023, 135 (2023). https://doi.org/10.1007/JHEP02(2023)135

[2] Proposal for an experiment to search for dark sector particles weakly coupled to muon at the CERN SPS, The NA64 Collaboration, CERN-SPSC-2019-002 / SPSC-P-359

## **Collaboration / Activity**

DUNE collaboration

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Session Classification: Poster session

Track Classification: Neutrino Physics