Searches for new physics with COMPASS at CERN SPS

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The Standard Model leaves open questions such as the nature of Dark Matter and the origin of the matter-antimatter asymmetry. One way to probe them is to search for feebly coupled new particles that mediate interactions with a dark sector. In this talk, I present two such searches based on data from the COMPASS at the CERN SPS.
First, I discuss a published search for Axion-Like Particles coupled to photons, based on a reinterpretation of the 2009 COMPASS Primakoff data, in which high-energy pion and muon beams hit a nickel target. An ALP produced via the Primakoff effect would mimic the single-photon signature of Standard Model Primakoff Compton scattering, which allows us to probe masses from about 0.2 to 600 MeV.
Second, I present ongoing work on a search for narrow dimuon resonances in the 2015 pion-induced Drell-Yan data, taken with a 190 GeV pion beam on an ammonia target. The preliminary results show no significant deviation from the Standard Model expectation, and are interpreted in baryo-muonphilic Z' models for masses between 4.3 and 8.5 GeV.
Together, the two analyses show how existing fixed-target data can be repurposed to complement collider and beam-dump searches for new physics.