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Investigating the Structure of Matter with the AMBER Experiment

The M2 beamline at the CERN/SPS can provide both muon and hadron beams with energy up to few hundred GeV. A new fixed-target experiment, AMBER (Apparatus for Meson and Baryon Experimental Research), explores this versatility by addressing several aspects of the so-called Emergence of Hadron Mass mechanism. The experimental program, started in 2021, includes in its already approved phase-I: the charge radius of the proton, measured in muon-proton elastic scattering; the parton momentum distributions in the pion, accessed from Drell-Yan and charmonia production; and the measurement of the antiproton production cross section in proton-helium collisions, a valuable input for Dark Matter search studies. The feasibility studies for an even more ambitious second phase of measurements are presently ongoing, that include the measurement of pion, kaon and antiproton charge radii; the kaon polarizability; a vast program addressing light meson spectroscopy, in particular in the strange sector; and the kaon parton distribution functions.

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Track Classification: New Facilities and instrumentation