

Measuring thermal dimuons at high baryochemical potential with the NA60+ experiment at the CERN SPS

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The high-intensity beams provided by the CERN SPS in a wide energy interval offer a unique opportunity to investigate the QCD phase diagram at high baryochemical potential μ_B . The NA60+ experiment, proposed for taking data with heavy-ion collisions at the SPS in the next years, has a strong potential for investigating the QCD phase diagram via measurements of electromagnetic probes in a beam-energy scan of Pb-Pb and p-A collisions in the interval $\sqrt{s_{NN}} = 6-17$ GeV.

In this talk the physics program of the NA60+ experiment on thermal dimuons will be described.

At beam energies below top SPS energy, the baryon density becomes maximal and its effect on ρ meson broadening can be measured by NA60+ with utmost precision.

NA60+ will have sensitivity to the ρ - a_1 chiral mixing mechanism, which provides access also to the properties of the a_1 by exploring the thermal dimuon mass spectrum in the range $1 < M < 1.4$ GeV.

For dimuon masses above 1.5 GeV, the temperature of the emitting source can be directly extracted by a fit of the mass spectrum. The experimental program of NA60+ plans to determine for the first time a caloric curve by measuring the temperature vs beam energy, with particular focus on $\sqrt{s_{NN}} < 10$ GeV, which is believed to be essential to map out the phase transition regime at high μ_B .

Finally, the competitiveness and complementarity of NA60+ in the landscape of the experiments foreseen at other facilities in the next decade will be discussed.

Category

Experiment

Collaboration

NA60+

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