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Search for critical fluctuations in the proton transverse momenta for A+A collisions at the NA49 experiment (SPS, CERN)

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We perform factorial moment analysis in the transverse momentum space of protons produced at midrapidity in A+A collisions at the NA49 experiment (SPS, CERN). After background subtraction we find power-law dependence of the correlator on the number of phase space cells for the systems Si+Si and Pb+Pb at 158A GeV with large values of the associated characteristic exponent (intermittency index). This behaviour is expected to occur when approaching the chiral critical endpoint of hadronic matter. Especially for the Si+Si system the measured intermittency index approaches in size the predictions of critical QCD. The intermittency effect is suppressed in Pb+Pb collisions at 40A GeV. The results of our analysis indicate that the value of the critical baryochemical potential should be closer to 240 MeV than to 380 MeV.

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