

EFFECTS OF LOCAL PARITY NONCONSERVATION IN STRONG INTERACTIONS IN Pb-Pb COLLISIONS AT LHC ENERGY

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It is known that the global conservation of spatial parity is a well-established symmetry of strong interactions. So far, no pieces of evidence have been found for P- and CP-symmetry breaking in strong interactions. However, QCD does not forbid local breaking of parity symmetry due to large topological fluctuations at high temperature with dynamical generation of configurations of nontrivial topological charge. The necessary condition for the observation of these effects is a sufficiently long lifetime of hot bubble which is accessible in central nucleus-nucleus collisions at LHC.

It was shown that the effect of local non-conservation of parity in strong interactions can be checked experimentally by the angular analysis of low-mass dilepton production in heavy-ion collisions [1-3] and by search of light hadron decays in specific channels which are forbidden by global parity conservation [4,5]. Parity, the decays of scalar charged a_0 meson into a photon and charged pion and into three charged pions can be referred to such processes.

In this work, the effects of local parity non-conservation have been implemented in the Monte Carlo realisation of the thermal model. The predictions of the invariant mass distributions of di-mesons and di-electrons are obtained in Pb-Pb collisions at LHC energy, taking into account the experimental resolution of the detectors. It is shown that the upgrade of the ALICE detector during the Long Shutdown 2 significantly improves the feasibility of these experimental studies at the LHC Run 3 [6].

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The speaker is a student or young scientist

No

Section

1. Intermediate and high energies, heavy ion collisions

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