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Baryon anomaly in heavy-ion collisions and colour correlations in QGP

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A baryon anomaly –an increase baryon-to-meson production ratio at intermediate transverse momenta in heavy-ion collisions when compared to proton–proton collisions –is observed at RHIC and the LHC. This effect is usually explained by recombination of constituent quarks during QGP hadronisation, or as a consequence of a strong radial flow developed during the heavy-ion collision. In this contribution, a different mechanism to favour baryon-over-meson production is proposed: when hadrons are formed in the recombination of nearby quarks and antiquarks, only colour-singlet combinations can be chosen. Hadron formation, in particular the probability to create baryons or mesons, depends on the distribution of colour charges among quarks. If the distribution is random –a reasonable assumption for Quark–Gluon Plasma (QGP) –the baryon-to-meson ratio is nearly twice higher than in the situation where quark colours are pre-arranged to obtain a white hadron in the combination of nearest quarks and antiquarks. The correlation of colour charges in the QGP also influences the distance over which recombination occurs. A study of the dependencies of the baryon-to-meson ratio and of the size of the recombination domain on the colour-correlation configuration will be presented.

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