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Magnetic field effect on hadron yield ratios and fluctuations in a hadron resonance gas

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We study the influence of an external magnetic field on hadron yields and fluctuations in a hadron resonance gas by performing calculations within an updated version of the Thermal-FIST package. The presence of magnetic field has a sizable influence of several yield ratios involving both strange and non-strange hadrons. In particular, the enhanced p/π ratio can be probed through centrality dependence in heavy-ion collisions. By attributing the centrality dependence of the p/π ratio in Pb-Pb collisions at 5.02~TeV measured by the ALICE Collaboration entirely to the magnetic field, we estimate its maximal strength at freeze-out. The magnetic field also enhances various conserved charge susceptibilities, which is consistent with recent lattice QCD data and is driven in the HRG model by the increase of hadron densities. We put these results in the context of measurements of hadron fluctuations and correlations.

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