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Hadron physics with ALICE at the LHC

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(for the ALICE collaboration)

The Large Hadron Collider collides protons and also lead ions (Pb) at energies of several TeV per nucleon-nucleon pair. In the case of Pb-Pb collisions, an extended volume of de-confined hot QCD matter is created which expands and cools, creating thousands of hadrons in a relatively small volume. This allows a rich programme of hadron physics to be pursued with A Large Ion Collider Experiment (ALICE).
Measurements in ALICE of the relative yields of some of the more common hadrons, π, K, p, and Λ support the hypothesis that the hadrons are created at a common temperature of around 155 MeV (1.8 x 10^12 K). We also observe yields of light nuclei and hyper-nuclei consistent with this temperature and approximately equal numbers of the respective anti-nuclei; anti-deuterons, anti-^3He and anti-^4He. With sufficiently large data samples we can observe enough anti-nuclei to explore their properties, such as our measurement of the difference in mass of the deuteron and anti-deuteron.
All the hadron species and nuclei abundances that we see are in broad agreement with a thermal production scenario which leads to the hypothesis that other, as yet unobserved, hadron states would, if they exist, follow this pattern. This novel means of potentially accessing exotic hadrons allows us to conduct searches, initially for di-baryon states and their anti-particles.
Finally, the hadrons which are produced apparently interact for a finite length of time, modifying the ratio of resonant to non-resonant states e.g. K*(892)/K. The final scattering between hadrons is sensitive to the interaction strength and the results of investigations using correlation techniques, among various meson and baryon species, are presented.

Primary author: Dr BARNBY, Lee (University of Derby)

Presenter: Dr BARNBY, Lee (University of Derby)

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