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First steps towards detection of the Bc meson in Pb-Pb collisions with the ALICE detector

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The Quark–Gluon Plasma (QGP) is a deconfined state of matter consisting of quarks and gluons, theorized to have existed during the earliest moments after the Big Bang. Hadronisation refers to the process by which quarks combine to form composite particles known as hadrons. Studying how hadronisation occurs within the QGP provides valuable insights into how the first particles in our Universe emerged from the high-energy primordial matter present immediately after the Big Bang.
In laboratory settings, high-energy lead–ion collisions can recreate tiny droplets of QGP, as achieved at the Large Hadron Collider (LHC). A particularly interesting approach involves studying heavy quarks (charm and beauty) as they are only produced in the initial collisions and persist throughout the entire evolution of the QGP. Previous research has shown that the production of J/ψ mesons (hadronised charm–anticharm pairs) can be either enhanced (regeneration) or suppressed depending on the QGP's temperature. A new study proposes to investigate the Bc meson (a bound state of a beauty and a charm quark) with the ALICE detector to gain deeper insight into the mechanisms of heavy-quark hadronisation within the QGP, as it is especially sensitive to the regeneration mechanism.
In this talk I will discuss the challenges of detecting the Bc with the ALICE detector and the steps which have already been made. In addition, I will show advancements with prompt/non-prompt J/ψ seperation in O-O collisions at the LHC, as a middle-ground between pp and Pb-Pb.

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