

# $\Upsilon$ polarization in pp and $J/\Psi$ polarization as a function of event plane in Pb–Pb with ALICE at the LHC

Thursday 5 May 2022 09:41 (19 minutes)

Polarization and spin-alignment measurements represent an important tool to understand the particle production mechanisms in proton-proton (pp) collisions. In heavy-ion collisions, quarkonium polarization could also be used to investigate the characteristics of a deconfined state of nuclear matter, the quark–gluon plasma (QGP), created at LHC energies. This measurement was performed for the first time in nucleus-nucleus collisions by ALICE, and a significant difference was found with respect to the LHCb results in pp collisions at  $\sqrt{s} = 7$  TeV. This difference could be related to the modification of the  $J/\Psi$  feed down fractions, due to the suppression of the excited states in the QGP, or to the contribution of the regenerated  $J/\Psi$  in the low transverse momentum region. Moreover, it has been hypothesized that quarkonium states could be polarized by the strong magnetic field, generated in the early phase of the evolution of the system, and by the large angular momentum of the medium in non-central heavy-ion collisions. This kind of information can be assessed by defining an ad hoc reference frame where the quantization axis is orthogonal to the event plane of the collision.

In this contribution, the final ALICE measurement of inclusive  $J/\Psi$  polarization with respect to the event-plane in Pb–Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV and the latest  $\Upsilon(1S)$  polarization measurement in pp collisions at  $\sqrt{s} = 13$  TeV will be presented. Both measurements are performed at forward rapidity with the muon spectrometer of ALICE, via the measurements of the angular anisotropy of their decay products.

## Submitted on behalf of a Collaboration?

Yes

**Primary author:** Ms DING, Yanchun (CCNU; IP2I)

**Presenter:** Ms DING, Yanchun (CCNU; IP2I)

**Session Classification:** WG4: QCD with Heavy Flavours and Hadronic Final States

**Track Classification:** WG4: QCD with Heavy Flavours and Hadronic Final States