Contribution ID: **319** Type: **Poster**

# Quarkonium production and polarization in pp collisions with ALICE

*Tuesday, 5 September 2023 17:30 (2h 10m)*

Quarkonium production in high-energy hadronic collisions is sensitive to both perturbative and non-perturbative aspects of quantum chromodynamics (QCD) calculations. Indeed, the production of the heavy-quark pair is described by perturbative QCD while the formation of the bound state is a non-perturbative process, treated in different ways by available theoretical models. Quarkonium polarization measurements provide also stringent tests of theoretical approaches, as this observable strongly depends on the quarkonium production mechanism at play. Another way to provide constraints on quarkonium production mechanisms is by looking at the production of J/$\psi$ inside jets. For instance, quarkonium production in a parton shower predicts that J/$\psi$ mesons are rarely produced in isolation, contrary to expectations from direct quarkonium production via parton-parton scattering. The measurement of quarkonium production and polarization in pp collisions can also provide a reference for investigating the fate of charmonium in the quark-gluon plasma formed in nucleus-nucleus collisions. ALICE can measure inclusive quarkonium production down to zero transverse momentum ($p_{\mathrm{T}}$), at forward rapidity (2.5 <$y$< 4) and midrapidity ($|y|$< 0.9). Prompt and non-prompt charmonium separation is performed at midrapidity down to low $p_{\mathrm{T}}$. In this contribution, we will report on recent quarkonium results in pp collisions at $\sqrt{s}$ = 13 TeV, including Y(nS) cross section measurements and Y(1S) polarization at forward rapidity, as well as the prompt and non-prompt J/$\psi$ production in jets at midrapidity. The status of new J/$\psi$ and $\psi$(2S) polarization analyzes at $\sqrt{s}$ = 13 TeV and forward rapidity will be shown. Finally, the status of new ongoing quarkonium production analyses using the Run 3 data at $\sqrt{s}$ = 13.6 TeV will be shown both at mid and forward rapidities. Results will be compared with available models.

## Category

Experiment

## Collaboration (if applicable)

ALICE

**Primary author:** KUMAR, Deekshit (Department of Atomic Energy (IN))

**Presenter:** KUMAR, Deekshit (Department of Atomic Energy (IN))

**Session Classification:** Poster Session

**Track Classification:** Heavy Flavor