

# Investigation of early magnetic field and angular momentum in ultrarelativistic heavy-ion collisions via $D^{*+}$ -meson spin alignment with ALICE

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Heavy quarks, i.e. charm and beauty, are produced at the initial stage of heavy-ion collisions. In the presence of a large angular momentum and initial magnetic field, they can be polarised. The quark polarisation is expected to be transferred to the hadron during the hadronisation process, and it can be probed by measuring the  $\rho_{00}$  parameter of the spin density matrix element of spin-1 hadrons.

We will present the first measurement of the  $\rho_{00}$  parameter of  $D^{*+}$  meson in Pb-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV, collected by ALICE during the LHC Run 2, and a comparison with the  $J/\psi$  polarisation measurement.

The  $\rho_{00}$  parameter of  $D^{*+}$  mesons measured in high-energy pp collisions will also be presented, including the first studies with Run 3 data. In this case, the measurement is performed also for  $D^{*+}$  mesons originating from B-meson decays, expected to be longitudinally polarised due to the helicity conservation in weak decays.

## Alternate track

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Yes

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