

# Open heavy-flavour production from small to large collision systems with ALICE at the LHC

Thursday, 30 July 2020 11:48 (24 minutes)

Open heavy flavours are effective probes of the hot and dense matter, the quark-gluon plasma (QGP), produced in ultra-relativistic heavy-ion collisions. Due to the very short time scale characterising their production, they experience the whole evolution of the system. In particular, measurements of open heavy-flavour production in Pb-Pb collisions at the LHC energies, including nuclear modification factors, give insight on the mechanisms of heavy-quark transport and energy loss in the hot and dense QCD matter.

The measurements of elliptic flow ( $v_2$ ) of open heavy-flavour particles provide information about the thermal degrees of freedom of heavy quarks in the QGP, path-length dependence of heavy-quark in-medium energy loss and recombination effects during the hadronization. To study the higher flow harmonics, such as the triangular flow ( $v_3$ ), provides further constraints on fluctuations in the initial state of the system and on the ratio of the shear viscosity to the entropy density of the QGP,  $\eta/s$ . The directed flow ( $v_1$ ) of open heavy-flavour particles is sensitive to the unprecedentedly strong magnetic fields present in the early stages of the collision, and so measurements of its charge dependence are key to constraining the electrical conductivity of the QGP.

In small hadronic systems like pp and p-Pb, open heavy-flavour production provides the baseline for the investigation of hot-medium effects in heavy-ion collisions, as well as tests of perturbative QCD and measurements of cold-matter effects in the nuclear medium.

In this contribution, ALICE results on open heavy-flavour production in pp, p-Pb and Pb-Pb collisions at various energies will be discussed. New measurements will be presented for fully reconstructed charmed mesons, as well as for single electrons and muons from open heavy-flavour hadron decays.

## I read the instructions

## Secondary track (number)

**Primary author:** VERMUNT, Lucas Anne (Utrecht University (NL))

**Presenter:** VERMUNT, Lucas Anne (Utrecht University (NL))

**Session Classification:** Heavy Ions

**Track Classification:** 07. Heavy Ions