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## Anisotropic flow fluctuations relative to participant and spectator planes in heavy-ion collisions with ALICE

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Measurements of anisotropic flow in heavy-ion collisions are key to extract properties of the quark-gluon plasma (QGP). The combination of different flow harmonics relative to the participant and spectator planes provides a unique insight into the initial conditions and the space-time evolution of such collisions. In particular, the spectator plane provides novel information about the three-dimensional orientation of the colliding system. We report on the centrality and transverse momentum dependence of anisotropic flow coefficients  $v_n$  measured at the central pseudorapidity region relative to the participant, using the cumulant method, and newly also the spectator planes in Pb-Pb and Xe-Xe collisions. In ALICE, the spectator plane is reconstructed from the deflection of neutron spectators using the Zero Degree Calorimeters. The scaling of ratios of  $v_2$  to eccentricities of the initial state  $\varepsilon_2$  with entropy density in Xe-Xe and Pb-Pb collisions are shown, which quantify non-linear effects of the QGP hydrodynamic evolution. The ratio of  $v_2$  relative to the spectator plane and  $v_2$  relative to the participant plane is compared to ratios of the corresponding eccentricities predicted by models of the initial state. The transverse momentum dependence of the shape of flow fluctuations, specifically the skewness and kurtosis, is presented, which allows to probe its modification inside the QGP through the comparison to hydrodynamic models.

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