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## Measurement of azimuthal anisotropy of the $f_0(980)$ and $D^0$ mesons in heavy ion collisions at CMS

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We present novel insights into the elusive  $f_0(980)$  hadron's quark composition and the interaction of heavy charm quarks with the quark-gluon plasma (QGP) through the anisotropic flow measurement of  $D^0$  in Heavy-Ion collisions. The  $f_0(980)$ , whose precise configuration has remained controversial, is reconstructed for the first time via its dominant decay channel,  $f_0(980) \rightarrow \pi^+ \pi^-$ , using data from proton-lead collisions at 8.16 TeV, as collected by the CMS experiment. The azimuthal angle anisotropy  $v_2$  of  $f_0(980)$  relative to the event plane is also investigated, allowing us to extract the  $v_2$  parameter for the  $f_0(980)$  and compare it with other hadrons. In addition, we also investigate how heavy quarks interact with QGP by measuring the coefficients of azimuthal anisotropy ( $v_n$ ) of  $D^0$  mesons in lead-lead collisions at 5.02 TeV with CMS experiment. The measurements cover a wide range of transverse momentum and thus reveal the flow formation mechanisms of heavy charm quarks, illuminating the diffusion and path-dependent parton energy loss.

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