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## New insights on heavy flavor dynamics and hadronization in the small-system collisions with CMS

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The observation of collectivity in small hadronic collisions raises the question whether the tiny droplet of quark gluon plasma can form in systems with size significantly smaller than nucleus-nucleus collisions. Dynamics and hadronization of heavy flavor quarks in small-system collisions provide a powerful tool to address the origin of observed collective phenomena because of their early production time and sensitivity to the finite system size effect. A comprehensive study of charm (prompt  $D^0$ ,  $J/\psi$  mesons) and bottom (via non-prompt  $D^0$  mesons) hadron elliptic flow in proton-proton and proton-lead collisions with the full LHC Run-2 data collected by the CMS experiment is presented, where a mass hierarchy is observed. New measurements of the charm baryon  $\Lambda_c^+$  yields and ratios to prompt  $D^0$  yields are also presented as functions of  $p_T$  and event multiplicity, and are directly compared with light flavor strange baryon-to-meson ratios to provide constraints on the charm hadronization in small systems. These results are compared to theoretical models, which provide crucial new insights to charm hadronization mechanisms and possible QGP medium effects in high-multiplicity small-system collisions.

**Author:** CMS

**Presenter:** ZHANG, Yousen (Rice University (US))

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