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Multi-particle correlations in small collision systems with CMS

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Multi-particle correlations in hadronic colliding systems at both RHIC and the LHC are under detailed investigation in the past year. Indeed, a wealth of experimental evidences in recent years has suggested the presence of collective phenomena and a possible QGP medium being formed also in high-multiplicity pp and pPb collisions. In particular, multi-particle cumulant analyses have established the collective nature of these correlations. Nevertheless, despite the fact that a common paradigm seems to emerge for all hadronic systems, the exact underlying mechanism still need to be understood. In particular, the measurement of azimuthal anisotropy coefficient (v_n) down to low multiplicities is still challenging experimentally. Based on recent data collected by CMS experiment, multi-particle correlation results will be presented for pp and pPb collisions. In addition, new methods introducing sub-events in the cumulant method and the first results will be presented. These results provide new insights on the origin of observed long-range correlations in small colliding systems and might be able to disentangle between different interpretations of the observed collective behavior.

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