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Measurement of charged particle mixed higher order flow harmonics and nonlinear response coefficients in PbPb collisions
SHENGQUAN TUO, Vanderbilt University, CMS COLLABORATION — Higher-order flow harmonics can be measured either with respect to the event plane of the same order, a lower order event plane, or a mixture of lower order planes. Studies of flow harmonics using the same order event plane have been used to extract the transport properties of the hot and dense medium produced in the collisions and to explore initial state effects. The mixed higher-order harmonics have been proposed to have sensitivity to initial conditions and shear viscosity over entropy density ratio of the medium during the hydrodynamic evolution and at freeze-out. In this talk, the mixed higher order flow harmonics and nonlinear response coefficients of charged particles are measured as a function of p_T and centrality in PbPb collisions at $\sqrt{s_{NN}} = 2.76$ TeV and 5.02 TeV with the CMS detector. The results are obtained using the scalar-product method, and cover a p_T range from 0.3 to 8.0 GeV/c, pseudorapidity $|\eta| < 0.8$, and a centrality range of 0 - 60%. It is observed that the nonlinear response coefficients of the odd harmonics are larger than the even harmonic ones for p_T less than 3 GeV/c. The results are compared with hydrodynamic predictions with different shear viscosity to entropy density ratios and different initial conditions.

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