

# Observation of charge-dependent azimuthal correlations in pPb collisions with CMS and its implication for the search of the Chiral Magnetic Effect

*Tuesday, February 7, 2017 3:00 PM (20 minutes)*

Charge-dependent azimuthal correlations relative to the event plane in AA collisions have been suggested as providing evidence for the chiral magnetic effect (CME) caused by local strong parity violation. However, the observation of the CME remains inconclusive because of several possible sources of background correlations that may account for part or all of the observed signals. This talk will present the first application of three-particle, charge-dependent azimuthal correlation analysis in proton-nucleus collisions, using pPb data collected with the CMS experiment at the LHC at  $\sqrt{s_{NN}} = 5.02$  TeV. The differences found in comparing same and opposite sign correlations are studied as a function of event multiplicity and the pseudorapidity gap between two of the particles detected in the CMS tracker detector. After selecting events with comparable charge-particle multiplicities, the results for pPb collisions are found to be similar to those for PbPb collisions collected at the same collision energy. With a reduced magnetic field strength and a random field orientation in high multiplicity pPb events, the CME contribution to any charge separation signal is expected to be much smaller than found in peripheral PbPb events. These results pose a challenge for the interpretation of charge-dependent azimuthal correlations in heavy ion collisions in terms of the chiral magnetic effect.

## Preferred Track

Correlations and Fluctuations

## Collaboration

CMS

**Primary author:** TU, Zhoudunming (Rice University (US))

**Presenter:** TU, Zhoudunming (Rice University (US))

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