Contribution ID: **494**   Type: **Poster**

Forward-Backward Net Charge Correlations in pp Collisions 7 and 13 TeV using PYTHIA-8

Monday 12 December 2022 14:00 (1 hour)

Correlation between the various observables, like, multiplicity, sum of event transverse momenta or the net charge of particles produced in pp collisions at LHC energies within intervals separated in pseudorapidity and azimuth angle is regarded as a sensitive tool to investigate the collision dynamics and test the models of hardon production. In the present work forward-backward (FB) correlation method is used to measure the net charge angular correlations. Two small windows of width $\delta\eta$ in pseudorapidity and $\delta\phi$ in azimuth angle are considered and placed in such a way that their values lie at (η_1, ϕ_1) in backward and at (η_2, ϕ_2) in forward region. The value of net charge $Q = n_+ - n_-$ in these windows on event-by-event basis are estimated and the FB net charge correlation coefficient is calculated using the relation $b_{QQ} = (\langle Q_F Q_B \rangle - \langle Q_F \rangle \langle Q_B \rangle)/(\langle Q_F^2 \rangle - \langle Q_F \rangle^2)$. Events corresponding to pp collisions at $\sqrt{s}$ = 7 and 13 TeV are simulated using the Monte Carlo event generator PYTHIA-8. The events are simulated by setting the color re-connection on/off and Bose-Einstein (B.E) effects on/off. In the present study of the variations of b_{QQ} with η_{sep} in different ϕ regions for 7 TeV pp data, it is observed that the value of b_{QQ} are negative except for η_{sep} =0 and $\delta\phi = 0$, when B.E effects are switched as 'on'. The absolute value of b_{QQ} are observed to decrease with increasing η_{sep} and approach to zero for $\eta_{sep} \sim 1$. This indicates that there is a transition between negative and positive correlation coefficients at higher rapidity gaps. Some structured variations in the values of b_{QQ} are seen in the region of smaller η_{sep}, which seems to be of interest. Similar structured behavior have been observed in balance function studies too. The effects of Bose-Einstein correlation and the color re-connection on the correlation coefficient may also be noticed in the figure, particularly, in the region of small η_{sep}. These findings will be discussed in detail and a comparison with 13 TeV results will be presented.

Session

Heavy Ions and QCD

Primary author: Dr CHANDRA, Anuj (Department of Physics, Aligarh Muslim University, Aligarh - 202 002, U.P, INDIA)

Co-authors: Ms ALI, Bushra (Department of Physics, Aligarh Muslim University, Aligarh - 202 002, U.P, INDIA); Prof. AHMAD, Shakeel (Department of Physics, Aligarh Muslim University, Aligarh-202 002, U.P., INDIA)

Presenter: Dr CHANDRA, Anuj (Department of Physics, Aligarh Muslim University, Aligarh - 202 002, U.P, INDIA)

Session Classification: Poster - 1