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Estimation of Bjorken initial energy density in p-p collisions

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Initial energy density produced in ultrarelativistic hadronic and heavy-ion collisions is an important quantity for characterisation of the system created in these collisions. In this work the Bjorken initial energy density is estimated in proton-proton collisions at $\sqrt{s} = 5.02, 7$ and 13 TeV for both minimum bias and different multiplicity classes with a new method using experimental data for proton radius R = 0.89 fm taken from electron proton scattering and taking the area of overlap region of collisions as πR^2. The same quantity has also been calculated for minimum bias pp collisions only for $\sqrt{s} = 0.9, 2.76$ and 8 TeV. It is observed that the Bjorken initial energy density in proton-proton collisions in high multiplicity events for the above mentioned collision energies reach the value that is obtained in case of Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV [1] and 5.02 TeV [2]. The results obtained in this work are also compared to those reported earlier for $\sqrt{s} = 7$ TeV [3] that uses the overlap area obtained from Gaussian scattering density profile.

[1] Phys. Rev. C **93**, no.2, 024911 (2016)
[2] Sci. Rep. **12**, no.1, 3917 (2022)
[3] Universe **3**, no.1, 9 (2017)

Session

Heavy Ions and QCD

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