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Density and Pressure Distribution inside Proton

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One of the basic building blocks of the universe is protons, whose constituent particles are quarks and gluons. Gluons are the exchange particles for the strong force between quarks; we never found them in isolation. Recently in 2018, Burkert et al. [1] found very interesting pressure distributions inside the proton, whose peak value can reach up to 1035 pascals, which is even greater than the pressure of neutron star, obtained near the center of the proton up to 0.6 fm. In the next year (2019), Shanahan et al. [2] came to a similar conclusion by exploring the energy momentum tensor of protons. In this present work, we have explored the proton pressure from the knowledge of statistical mechanical understanding by considering the pressure inside the proton in terms of effective chemical potential, which is assumed to be a function of the radius of proton. We attempt to realize the picture in terms of degenerate quark gas tomography.

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