

High-density QCD with CMS at the LHC

David d’Enterria¹
on behalf of the CMS collaboration

¹ *CERN, PH/EP, CH-1211 Geneva 23*

Abstract

We will present the capabilities of the Compact Muon Solenoid (CMS) experiment to explore the rich heavy-ion physics programme offered by the CERN Large Hadron Collider (LHC). The collisions of lead nuclei at energies $\sqrt{s_{NN}} = 5.5$ TeV will probe quark and gluon matter at unprecedented values of energy density. The prime goal of this research is to study the fundamental theory of the strong interaction — Quantum Chromodynamics (QCD) — in extreme conditions of temperature, density and parton momentum fraction (low- x). This presentation will cover in detail the potential of CMS to carry out a series of representative Pb-Pb measurements. These include “bulk” observables — charged hadron multiplicity, low p_T inclusive hadron identified spectra and elliptic flow — which provide information on the collective properties of the system; as well as perturbative processes — such as quarkonia, heavy-quarks, jets, γ -jet, and high p_T hadrons — which yield “tomographic” information on the hottest and densest phases of the reaction.