Overview of Heavy Ion Results from CMS at the LHC

G. Roland, on behalf of the CMS Collaboration[1]

[1] *Massachusetts Institute of Technology, USA*

Contact email: *rolandg@mit.edu*

The first runs colliding lead nuclei at the LHC occurred in late 2010 and 2011, with the latter increasing the available event sample by more than an order of magnitude. Collisions of protons with lead were studied in a pilot run in late 2012 and a higher statistics physics run in early 2013. Heavy ion collisions at the LHC are expected to produce a partonic medium which has a higher energy density and a longer life-time than could be created at RHIC. Proton-nucleus collisions serve two purposes. The primary goal is to study possible differences between pp, pPb, and PbPb due to initial state effects. In addition, particle multiplicities in some pp and pPb events approach those seen for smaller nuclei and lower energies at RHIC. Comparison of these extreme pp and pPb events to those from heavy ion data can probe the separate influences of particle density and system size. The CMS detector systems are well suited to measuring a wide array of observables in the high multiplicity environment of these collisions. In particular, the detector is optimized to identify and characterize the high transverse momentum photons and charged particles which result predominantly from hard partonic scatterings, as well as having excellent resolution for the decays of heavy particles. Such hard scatterings and heavy produced particles are significantly enhanced at the higher beam energies provided by the LHC. This talk will give an overview of what has been learned about the nature of the hot and dense medium created in high energy heavy ion collisions as well as their similarities/differences with extreme collisions in pp and pPb.