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Light Ion Collisions at the LHC

In the week of 11-15 November 2024, more than 150 theorists, experimentalists and accelerator physicists met at CERN to discuss newly emerging opportunities with light ion beams, cern.ch/lightions. This workshop responded to the growing realisation that light ion collisions open qualitatively novel possibilities for the study of QCD at extreme temperature or parton densities. In particular, it has been demonstrated that even short special runs (such as the "pilot"runs with p-Pb in 2012 and Xe-Xe in 2017) can address central open questions resulting from recent discoveries of the LHC heavy ion programme, and that such short runs are also of interest for neighbouring physics communities including nuclear structure and cosmic rays. With this consensus report, the workshop participants summarise the main motivations for future light ion collisions at the LHC.

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