Theoretisches Seminar

Physikalisches Institut

UNIVERSITÄT BONN

Seminarraum bctp 1 (R. 2.019)
Wegelerstraße 10
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14 Uhr c.t.

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„Light-Ion Collisions : Bridging Small and Large QCD Systems“

The first oxygen–oxygen and neon–neon collisions at the LHC this July have opened a new frontier in exploring hot and dense QCD matter. These light-ion systems bridge the gap between proton–proton and heavy-ion collisions, enabling tests of quark–gluon plasma formation in smaller and more controlled environments. Over the past decade, experiments have revealed intriguing but sometimes puzzling results: signals of elliptic flow appear even in proton–proton collisions, whereas clear signs of jet quenching remain absent in small systems. The recent pO, OO, and NeNe runs now provide the first unbiased access to intermediate-size systems and allow precision tests of heavy-ion models. Light-ion collisions probe the critical regime where nuclear structure, perturbative QCD, and quark–gluon plasma physics intersect.

I will discuss what the first light-ion data reveal about the structure of the colliding nuclei, the applicability of hydrodynamics, and the onset of partonic energy loss in small systems. The results indicate that many phenomena once thought unique to heavy-ion collisions persist even in much smaller systems—suggesting that collective behavior may be an intrinsic feature of QCD itself.