



Contribution ID: 51

Type: **not specified**

Ultra-relativistic Heavy-Ion Collisions: Inputs of the Italian community for the ESPP 2026

This document has been prepared by the community that is active in Italy, within INFN (Istituto Nazionale di Fisica Nucleare), in the field of ultra-relativistic heavy-ion collisions. The experimental study of the phase diagram of strongly-interacting matter and of the Quark–Gluon Plasma (QGP) deconfined state will proceed, in the next 15–20 years, along two directions: the high-energy regime at the HL-LHC, and the low-energy regime at FAIR, NICA and SPS. The Italian community is strongly involved in the present and future programme of the ALICE experiment. A number of fundamental questions will remain open after the LHC Run 4: in order to address these questions and fully exploit the unique LHC potential for this physics the new detector ALICE 3 will enable, in the late 2030s, novel studies of the QGP using, among others, multi-differential measurements of heavy-flavour hadron and thermal dileptons. In addition, there is a growing interest in a possible future experiment at the SPS, which would primarily target the search for the onset of deconfinement using dimuon measurements. The strong expertise of the community in detector development and construction, in particular in the sector of low-material silicon trackers and particle identification constitutes a common basis for these new projects at the LHC and SPS. On a longer timescale, the community expresses interest for a heavy-ion programme at the Future Circular Collider.

Author: BRUNO, Giuseppe (Universita e INFN, Bari (IT))