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## Accelerator R&D proposals by INFN

The study of the next accelerator at CERN is fundamental to the future of European particle physics, as highlighted in the INFN National Input document. Within the current ESPP, INFN has already provided substantial support to the particle accelerator R&D program through various initiatives relating to the general design of the Future Circular Collider (FCC) and the muon collider, as well as to advanced and less specific technologies. This document summarizes these ongoing activities and new ones, all of which INFN considers to be of crucial importance for the next ESPP, and which it intends to develop in collaboration with CERN and other European partners. These include improvement of superconducting radiofrequency cavities (both bulk-Nb and thin-film coated), higher-field superconducting magnets for colliders and detectors, machine–detector interface studies for FCC-ee and the muon collider, design of the FCC-ee-injector damping ring, FCC collective effects studies and beam pipe material testing. High-efficiency novel positron sources based on oriented crystals, enhanced RF coupling window designs and AI support in accelerator setup and operation are also planned, being not less important for several schemes of future colliders and for FCC. Finally, emphasis is put on developments for plasma-based colliders, a theme strongly connected to the EuPRAXIA project which is being exploited in Frascati.

**Authors:** ALESINI, David; BISOFFI, Giovanni (INFN)