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## **C2Or3D-03: Status of the MINERVA cryomodules and associated cryogenic system (MYRRHA phase 1)**

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MYRRHA at SCK CEN in Mol/Belgium will be the world's first large-scale Accelerator Driven System (ADS) at power levels scalable to industrial systems for unparalleled research opportunities in spent nuclear fuel, nuclear medicine, and fundamental and applied physics. MYRRHA was approved by the Belgian government in 2018, releasing the funding for a first phase of staged implementation and operation. MINERVA, the implementation of phase 1 of MYRRHA, covers the design, construction and commissioning of the first Linac section up to 100 MeV, a Proton Target Facility (PTF) and a Full Power Facility (FPF). It is scheduled to start beam operation in 2027. Phase 1 also comprises R&D and pre-licensing towards the MYRRHA sub critical reactor driven by a 600 MeV proton beam.

The MINERVA proton linac will accommodate 30 identical cryomodules to boost the beam energy delivered by the normal-conducting frontend from 16.6 MeV to 100 MeV. Each cryomodule will contain two superconducting RF single-spoke cavities immersed in a superfluid Helium bath at 2 K. The design and architecture of the overall cryogenic system is derived from the stringent reliability requirements imposed by the future reactor.

We present the design, architecture, and development status of the MINERVA cryomodules and associated cryogenic system towards the implementation phase of the project, as currently defined in collaboration with the collaboration partners at IJClab, ACS, and CEA/DSBT. Additionally, we summarize the preliminary results of cryogenic and RF tests for the prototype MINERVA cryomodule, while these activities are ongoing at the site of SCK CEN's collaboration partner IJClab.

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