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## **Cryodiagnostics of SC-accelerators with fast cycling superferric magnets**

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This report presents long-term experience in cryodiagnostics of superconducting accelerators cooled with two-phase helium flows. It concerns: resistive temperature (T) sensors for wide applications including the magnetic field and irradiation environments, their calibration system and features to mount these sensors; RF-void fraction (VF) sensors and set-up to calibrate them; a discrete level-meter (L) based on a resistive temperature sensor suitable for all cryogenics; the two-phase helium flow-meters (G) which are able to operate in the VF-range from 0 to 100 %. A measuring system based on a modular industrial computer to find values of T, VF, L, G and pressure, P, is also described. A way to produce a multi-channel measuring system is proposed which can be applied for superconducting accelerators like SIS100-FAIR and NICA. Separate sensors and measuring devices can be used in nitrogen, hydrogen and LNG systems. It is also shown that the experience gained in cryodiagnostics allows separationless flow-meters to be produced for the three-phase oil-salty water-gas flows that are typical in the oil production industry.

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