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C1Or2A-05: Stable Operation of Cryogenic System at 2K during the RF or Magnet Power Variations

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In the last decades, several laboratories, like CERN, DESY, CEBAF, constructed the accelerators with large number of superconducting (sc) cavities or magnets operating at 2 or 4K temperature levels. Other accelerators, e.g. at GSI/FAIR, SLAC, MSU, ESS are under construction. Typically, the operation of sc cavity requires narrower ranges of pressure variation than ones of sc magnets. For large accelerators a complicated controlling of refrigerator and cryogenic system is required, which requires more elaborated design in comparison to small testing benches or single cavities modules. A review of controlling principles and loops, typically applied for the controlling of liquid helium level and pressure for large accelerators is presented. Other possible control loops, e.g. cascade control or multivariable feed-back (or with feed-forward option), are discussed. Activities, which are required for the commissioning of control loops and supporting measurements, are also mentioned. Supplementary measurements on thermal equilibration time constant between gaseous and liquid superfluid helium are also presented.

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