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The ESS Cryomodule Test Stand

Thursday 10 July 2014 17:45 (15 minutes)

The European Spallation Source (ESS) is an intergovernmental project building a multidisciplinary research laboratory based upon the world's most powerful neutron source to be built in Lund, Sweden. The ESS will use a linear accelerator which will deliver protons with 5 MW of power to the target at 2.0 GeV with a nominal current of 62.5 mA. The superconducting part of the linac consists of around 150 niobium cavities cooled with superfluid helium at 2 K. The majority of these cavities are of the elliptical type. They are grouped in cryomodules that hold 4 cavities each, with beam correction optics located between the cryomodules. A dedicated cryoplant will supply the cryomodules with single phase helium through an external cryogenic distribution line. Each of the 30 cryomodules containing elliptical cavities will undergo their site acceptance tests at the ESS cryomodule test stand in Lund. This test stand will use a dedicated 4.5 K cryoplant and warm sub-atmospheric compression to supply the 2 K helium as well as the 40/50 K shield cooling. A test bunker will accommodate one elliptical cavity cryomodule at a time and provide test capacities during both the installation phase as well as later during operation. We will show the requirements for the test stand, based on the needs of the cryomodule production and installation process. We will present its layout and discuss the factors determining the required cryogenic capacity, test sequence and schedule.

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