

Status of the SIS100 local cryogenics*

B. Streicher¹, T. Eisel¹, J. C. Velasco¹, M. Chorowski², A. Iluk², P. Duda², M. Kauschke¹, J. Polinski²,
A. Täschner¹, F. Wamers¹, and H. Kollmus¹

¹GSI, Common Systems: Cryogenics, Darmstadt, Germany; ²Wroclaw University of Technology, Poland

Introduction

The cryogenic system for the FAIR (Facility for Antiproton and Ion Research) superconducting (SC) SIS100 synchrotron and its first specified components were described in [1]. The design progress, project evolution as well as newly specified components are described in the following sections.

By-Pass Line

By-pass Lines (BPLs) pass each of the six straight warm sections of SIS100 to supply liquid helium and cold electrical connections to the SC quadrupole doublets within these sections. Detailed technical specification [2] concerning the BPL system was prepared and approved at GSI in 2013. Based on this, the in-kind contract was signed between FAIR and the Wroclaw University of Technology (WrUT). In conjunction with the cryogenic group CSCY, the WrUT has worked out a detailed technical design of the first BPL part connecting the cryogenic feed-in point at SIS100 directly to the cold arc magnet (see Fig. 1). The design details and interfaces were settled during the Final Design Review held at GSI in February 2015. It includes the design of process pipes, bus-bars, vacuum vessel, supports and instrumentation. The production of this first component will start during first quarter of 2015 and is supposed to be finished and delivered to GSI before the end of 2015. This component will be a part of the SIS100 String Test set-up tested at Serial Test Facility connecting first dipole and quadrupole. Moreover, a new clamping system to fix the bus-bar pairs was developed at WrUT and is currently being tested at GSI. This clamping system shall be used in the SIS100 BPLs.

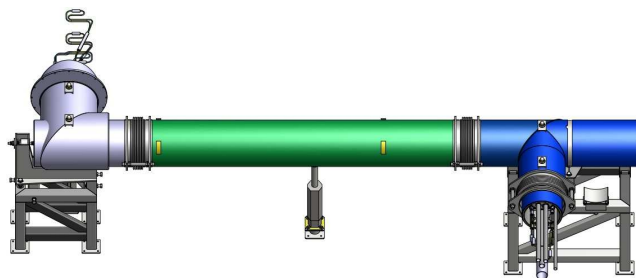


Figure 1: 3D model representation of the final design for BPLP50 (see [2]) made by WrUT.

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Current Lead Box (CLB)

In order to supply the electrical connections for 4 types of SC magnets, in total 8 electrical circuits have to be cooled from normal conducting state to the SC state entering the SIS 100 accelerator ring. Devices called Current Lead Boxes perform this duty. The detailed specification of this particular component for the local cryogenic system of SIS100 was finished and submitted to the EDMS system in October 2014 (see [3]). An elaborated 3D model (see Fig. 2) was already prepared at GSI as well as flow scheme and control and instrumentation including basic P&ID. Based on this document, WrUT together with GSI shall prepare this component's design till the end of 2015. The in-kind contract concerning this component is currently being prepared at GSI.

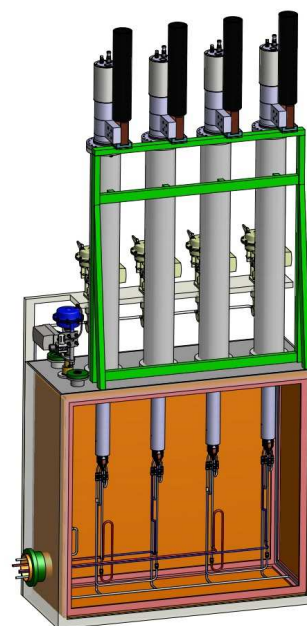


Figure 2: Schematic representation of a SIS100 current lead box specified at GSI (see [3]).

References

- [1] B. Streicher et.al., Cryogenics for SIS100 Accelerator, GSI Preprint (<http://repository.gsi.de/record/68024>)
- [2] Detailed Specification of the Local Cryogenic By-Pass System for SIS100 (<https://edms.cern.ch/document/1261140/8>)
- [3] Current Lead Boxes for SIS100 (<https://edms.cern.ch/document/1174196/1>)