DEVELOPMENT of STF CRYOGENIC SYSTEM in KEK

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INTRODUCTION

In KEK, in order to develop superconducting RF cavities for ILC......

Development of

Superconducting RF Test Facility (STF.)
*Accelerator (Cryomodule)
*Cryogenic System
PROJECT of STF CRYO.

Under the leadership of KEK,

Concept

Design Meeting & Procurement

Construction

KEK

Positive Japanese Cryo. Companies

Mayekawa

Vacuum System

Hitachi Plant Technologies

Control System

Taiyo Nippon Sanso group

Hardware

Hitachi TS.

Operation

Project Management by KEK
DESIGN CONCEPT of STF CRYOGENIC SYSTEM

1) Fully Simple Design
   30W at 2.0K for initial prototype

2) For several future usage
   (experiment or development for testing other component)

3) Adopting several components developed by KEK
   (Transfer lines, GHe pre-cooler, Cryogenic Heat Exchanger, etc.)
STF CRYOGENIC SYSTEM

- He Ref. TCF-200
- GHe Pre-cooler
- LN2
- TRT
- Gas Bag
- Mechanical Booster Pumps
- Rotary Pumps
- Under Ground Area
- LHe Dewar 2000L
- 2.0K Control Dewar Cold Box
- 4.5K Vessel
- JT Valve
- 2.0K Vessel
- Cryomodule (STF)
- 2.0K Saturated (30Torr)
<table>
<thead>
<tr>
<th>Project</th>
<th>FY. 2005</th>
<th>FY. 2006</th>
<th>FY. 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Design Meeting</td>
<td>Monthly Design Meeting at KEK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>He Ref. Restore</td>
<td></td>
<td>Aug.</td>
<td></td>
</tr>
<tr>
<td>Detail Design</td>
<td>Design and Procurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. Fabrication</td>
<td>Fabrication of 2K Control dewar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer line Fabrication</td>
<td>Transfer line Manufacturing</td>
<td>Transfer line Installation</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td>Inspection</td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td>June</td>
</tr>
</tbody>
</table>
STF Cryogenic System (Building)

STF Building in KEK

Compressor House and LN2 Storage
Helium Refrigerator (Restored)

Former
SULZER
TCF-200

Helium Ref. was restored
(used as KEKB, more than ten years ago)

Ref.: 600W at 4.4K
Liq.: 280L/h
2K CONTROL DEWAR

- 4.5K Dewar
- 23 Torr Evacuation (vertical penetration)
- JT Heat Exchanger (vertical counter flow)
- 1\textsuperscript{st} JT Valve
- 2.0K Dewar
EVACUATION UNIT

Rotary Pumps

Mechanical Booster Pumps
GHe CIRCULATION SYSTEM

LN2 Vessel

LN2 Heat Exchanger

KEK original design
All Transfer lines for STF cryogenic system has been fabricated by KEK with its original design.

30m length, 8m head
TRANSFERLINE (Ground Level)

KEK original Transfer lines
TRANSFERLINE (Underground)

He Ref. Level

Endbox

B1F Level

Cryomodule West End
2K Control Dewar and Cryo-module
CONNECTION with CRYOMODULE

2.0K Control Dewar
CONNECTION with CRYOMODULE

2.0K Control Dewar side

Cryomodule side
PC-DCS SYSTEM

PC-PLC System for Control and Data Acquisition

PID Controller
Start up and Shut down Programming
CONCLUSION & SCHEDULE

1) Prototype 2.0K cryogenic system has been constructed by KEK in collaboration with industries.
2) 2.0K Cryogenic System for KEK Cryo-module has also been constructed.
3) Initial cooling-down of 2.0K cryogenic system will be operated in June 2007.

[Further Schedule]
1) Cooling down STF Cryo-module.
2) Modifying for long term operation.
3) Development of key component of 2.0K cryogenic system.
INITIAL COOLING DOWN