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SDC
SOLENOIDAL DETECTOR NOTES

SDC PROJECT
SCINTILLATING FIBER TRACKER
ASSEMBLY HALL REQUIREMENTS

May 15, 1992

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SDC Project

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1.0 Introduction

This document outlines the assembly space requirements on-site at the SSCL for the outer barrel tracker - fiber option. This information is preliminary and will be updated as more is learned about the detail assembly requirements for the fiber tracker. The following assumptions form the basis for this document:

Superlayers will arrive at the SSCL preassembled. The fiber ribbons will be attached to the cylinders. Light tight bundles and shells will be installed on the waveguide and scintillating fibers. The nitrogen inerting cover will be in place.

Generally, the superlayers will arrive at the SSCL assembled to the support frame. However, some superlayers may arrive individually and be assembled to the support frame at the SSCL. The exact configuration is being studied at this time.

Receiving inspection and pre-installation testing will be performed at the SSCL.

Some final assembly and alignment verification will be performed at the SSCL.

2.0 Requirements Summary

Space

The total assembly hall space required for the fiber tracker is 3100 square meters. This should be a single open area 10 meters by 31 meters. Clear overhead space should be a minimum of 7 meters. A layout is included in section 5.0.

Utilities

The following utilities are required:

Electrical - 110/220 VAC

Instrument air - 100 psig w/deionizing nozzle heads

Water - potable, 1/2" line, 25 psig
distilled, portable supply

Computer hookup - ethernet with ten RS-232 connections

Nitrogen - portable bottles

Liquid Helium - two portable units, 500 liters each

Lighting - ultraviolet and blue immune fixtures - wavelength > 500 nm

Other

Other required services in addition to the above utilities are:

Overhead crane - 5 ton capacity

Temperature/Humidity/Cleanliness control - class 10,000, temperature 70 +/- 5 degrees F, humidity 50% or less

Access Door - 5 meters wide by 5 meters high

Epoxy coated floor

Dust barrier and "sticky pad" at primary entrances

3.0 Scenario

The current fabrication, assembly, and testing scenario for the fiber tracker is outlined in the following paragraphs.

Fiber ribbons, both scintillating and waveguide, will be fabricated and tested at fiber vendor sites and shipped to ORNL for assembly of superlayers.

Connectors will be fabricated at vendor sites and shipped to ORNL.

Cylinders, end rings, support brackets and rings, waveguide supports and inerting system supports will be fabricated and inspected at vendor sites and shipped to ORNL for assembly.

The light tight shells and nitrogen inerting covers will be fabricated and inspected at vendor sites and shipped to ORNL for assembly.

Fabrication of the superlayers will be accomplished at ORNL. This consists of placing the ribbons on the cylinders, connecting the waveguide fibers to the scintillating fibers, placing the light tight bundles on the waveguide fibers, and placing the light tight shell and nitrogen inerting cover on the superlayers.

Assembly of the superlayers will be accomplished at ORNL. This consists of mounting and aligning the completed superlayers on the support frame.

Liquid helium, VLPC, and nitrogen inerting system components, cabling, and piping will be fabricated, inspected and tested at vendor sites and shipped to the SSCL for final assembly and installation.

Final assembly and pre-installation testing will be performed at the SSCL. The following tests are planned:

Alignment Check - This will be a verification of the superlayer to superlayer alignment of the tracker upon arrival at the SSCL. Checks for out-of-roundness and distortion will be performed.

Channel Scan - To check for damage due to shipment, a simple laser scan of the system will verify that each fiber is operational

Light/Gas Tightness - The light tight and inerting gas covers will be checked to ensure no damage has occurred during shipping and handling. Light and gas tightness will be verified.

Cosmic Ray Test - This will be performed section by section to check the overall function of the tracker. Three cosmic ray test systems with 1024 channels of VLPC readout each will observe hits in overlapping ribbon sections.

4.0 Schedule

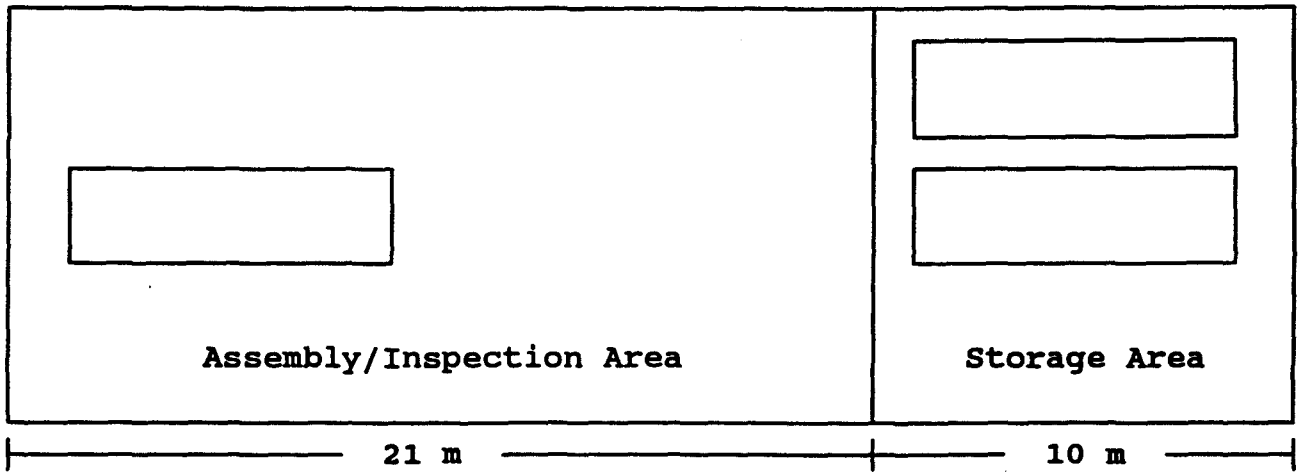
The fiber tracker superlayer assembly is scheduled to arrive at the SSCL on June 1, 1997. Final assembly and pre-installation testing activities in the assembly hall are scheduled for 14 months. This puts the fiber tracker at top of hole on August 1, 1998. Schedule durations for individual activities are shown below. These durations are based on a five day work week and one shift per day. Total float for these activities is approximately two calendar months.

Alignment check - 60 days

Channel Scan - 60 days

Light/Gas Tightness - 60 days

Cosmic Ray Test - 30 days

Final Assembly - 30 days

5.0 Facility Layout