SpinQuest Polarized Target

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Overview

What do you need to know about the polarized target system?

The polarized target system consists of 6 major subsystems:

- 1. The cryogenic Evaporation Fridge is designed to provide high cooling power (1 W) at 1 K.
- 2. The Pump Stack is two 7000 m³/hour in parallel backed by a 7000 m³/hour backed by a 755 m³/hour rotary vane.
- 3. The NMR (Nuclear Magnetic Resonance) system is needed to measure the polarization of the sample.
- 4. The CPI EIO (Extended Interaction Oscillator) is a microwave generator used in DNP.
- 5. The Target Material is a frozen solid material with the necessary characteristics for nucleon polarization.
- 6. The Oxford Superconducting Magnet is vertically pointing split pair magnet needed for DNP.

Ready to go What did you change? Notify watchers



What is special about the Drell-Yan Target

This system has the longest (along the beam-line) target cell to date for an evaporation fridge, this requires a unique microwave distributing horn and three NMR coils per target cell to further reduce systematics in the polarization measurement. This system was configured with the intention of having the greatest instantaneous luminosity of any previous evaporation system by having a beam intensity of 3X10¹² protons/sec for 5 seconds while using a large pump system 17,000 m³/hour (16,800 m³/hour at 60Hz). We are also running an experiment with both polarized protons and neutrons which share different sensitivity to the overall figure of merit of the Drell-Yan asymmetry.

Target Details

Introduction to the Drell-Yan PT

System Photos

Target Logbook

Polarized Target Training

Polarized Target Summary Anneal Summary Target Operators Target Troubleshooting

Target Expert Duties [Target Operator Duties]

Target Operation Procedure

PDP Restart Procedure Cryo Screen Restart Procedure Target Movement Procedure New Baseline Procedure Thermal Equilibrium Measurement Procedure [Prepare Fridge for Polarization] Anneal Procedure [Target Replacement Procedure] Magnet Energization Procedure NMR Setup Instructions

Target Documentation

Target Device List

LabVIEW Virtual Instrument (VI) Manual Magnet Power Supply Operation Piping and Instrumentation Diagram Hardware Manuals Cernox Target Insert Sensors Target To Do List Before Fermilab Target To Do List At Fermilab Target To Do List for Anchit Target To Get List (still needed equipment) Request Service from Fermilab Full Equipment List to be sent Fermilab Parts List By Subsystem Target Mechanics Simulations Experiment Schedule Penetration in Cave