

Basics of SeaQuest/SpinQuest

This page is for new Sea/SpinQuest members to find the basic information on the experiments. Only the minimum amount of keywords and facts are given here, in order to keep this page compact. You are expected to look into references (i.e. papers and presentations) to understand the meanings of the keywords/facts. It is still probable that the information in this page is not sufficient. You are highly welcome to request the page manager (Kenichi) to provide more information.

Physics - SeaQuest

The primary subject is the flavor asymmetry of light-antiquarks in the proton (called d-bar/u-bar) through the Drell-Yan process in p+p and p+d reactions.

- Section 2.1 of [the E906/SeaQuest proposal](#).
- The 1st measured result in [Nature 590, 561 \(2021\)](#).

Physics - SpinQuest

The primary subject is the Sivers function of antiquarks.

- Sections 2.1-2.4 of [the E1039/SpinQuest proposal](#).

Experimental Setup

The best reference should be [the SeaQuest NIM paper](#).

- Beam
 - Section 2.1
 - Beam protons are "bunched" with a time interval of 19 ns (=53 MHz).
 - The number of protons per bunch is typically 40,000.
 - The beam is shot at the SeaQuest targets in 5 seconds per 1 minute.
- Target (of SeaQuest)
 - The beginning part of Section 3
 - Liquid hydrogen (LH2) and Liquid deuterium (LD2) for the measurement of d-bar/u-bar etc.
 - Carbon, Iron and Tungsten (C, Fe and W) for the measurement of nuclear effects.
- Spectrometer
 - "Hodoscope" in section x.y
 - H1X, H2X, H3X, H4Y
 - The Y hodoscopes are less important since they are not used in the main trigger.
 - "Drift chamber" in section x.y
 - In Stations 1, 2 and 3
 - "Proportional Tube" in section x.y
- Trigger

SpinQuest utilizes the polarized target. The spectrometer is inherited from SeaQuest almost as is.

- Polarized target (of SpinQuest)
 - t.b.w.

Further Info

You could take a look at the following materials if interested in.

- Other SeaQuest physics
 - Partonic energy loss in cold nuclear matter (nuclear effect at beam side)
 - Section 2.2 of [the E906/SeaQuest proposal](#).
 - Antiquark distributions in nuclei (nuclear effect at target side)
 - Section 2.3 of [the E906/SeaQuest proposal](#).