Hephaestus: Hardware Control for SeaQuest Trigger and Tracking Systems

RYAN CASTILLO, Abilene Christian University, SEAQUEST/E906 COLLABORATION — E906/SeaQuest is a fixed-target Drell-Yan experiment using Fermilab’s 120 GeV Main Injector to measure cross sections for dimuon production in p+p and p+A collisions over a wide Bjorken-x range. Data from these collisions will be used to measure the d-bar/u-bar asymmetry in the proton sea, clarify the nature of parton energy loss in cold nuclear medium, and explore the shadowing/anti-shadowing effects observed by the European Muon Collaboration (EMC). In order to streamline operations, a hardware control program was developed for our hodoscope high voltage (HV) supply and level shifter boards (LSB), which control the front-end electronics for our wire chambers. This program has several advantages over the current software, including full integration into SeaQuest’s software framework and a user-friendly command syntax. This presentation will focus on SeaQuest’s physics motivations, as well as the motivation for and prominent features of the hardware control program, Hephaestus.

1This research supported in part by the U.S. DOE under grant #DE-FG02-03ER41243.