Dark Photon Monte Carlo at SeaQuest[1] CALEB HICKS, Abilene
Christian University, SEAQUEST/E906 COLLABORATION — Fermi National
Laboratory's E906/SeaQuest is an experiment primarily designed to study the ratio
of anti-down to anti-up quarks in the nucleon quark sea as a function of Bjorken
x. SeaQuest's measurement is obtained by measuring the muon pairs produced by
the Drell-Yan process. The experiment can also search for muon pair vertices past
the target and beam dump, which would be a signature of Dark Photon decay. It
is therefore necessary to run Monte Carlo simulations to determine how a changed
Z vertex affects the detection and distribution of muon pairs using SeaQuest's de-
tectors. SeaQuest has an existing Monte Carlo program that has been used for
simulations of the Drell-Yan process as well as J/psi decay and other processes. The
Monte Carlo program was modified to use a fixed Z vertex when generating muon
pairs. Events were then generated with varying Z vertices and the resulting simu-
lations were then analyzed. This work is focuses on the results of the Monte Carlo
simulations and the effects on Dark Photon detection.

Caleb Hicks
Abilene Christian University

Date submitted: 25 Jul 2016   Electronic form version 1.4