Abstract

We propose to use a circularly polarized photon beam at an incident photon energy range of 10 MeV to 40 MeV on a high-pressure polarized $^3$He target to carry out a spin-dependent differential cross section measurement from three-body photodisintegration of $^3$He. Such measurements will allow for a test of the state-of-the-art three-body calculations and represent an important study towards the ultimate goal of determining the GDH integral on $^3$He from the two-body breakup threshold to the pion production threshold. We request a total beam time of 240 hours with 100% efficiency at a minimum photon flux of $5 \times 10^7$/s for a photon energy spread of 3.0%.

\footnote{We will postpone the running of the experiment at photon energies higher than 20 MeV if the minimum flux has not been demonstrated.}