



Contribution ID: 138

Type: Oral (Non-Student) / orale (non-étudiant)

Photodisintegration of the Deuteron at 18 MeV using Linearly Polarized Photons

Thursday 19 June 2014 10:00 (15 minutes)

We report the cross section, σ , parameterized differential cross section, $\frac{d\sigma}{d\Omega}$, and analyzing power, $\Sigma(\theta)$, for neutron production via the photodisintegration of the unpolarized deuteron at 18 MeV using linearly polarized photons: ${}^2\text{H}(\gamma, n){}^1\text{H}$.

The data were taken in October 2010 using the free-electron laser at the High Intensity Gamma Source (HI γ S) at Duke University in Durham, North Carolina. The ejectile neutrons from the photodisintegration reaction were measured using the Blowfish detector array: a spherical array of radius 40.64 ± 0.3 cm composed of 88 BC-505 liquid organic scintillator cells which cover $\approx \pi$ steradians.

The initial goal of our experiment was to test a few potential sources of error, and so clean experimental runs were only taken with the remaining beam-time. Our data are therefore not optimized for precision, and so presented a number of data analysis challenges: which were overcome.

Contrary to earlier results near deuteron binding energy threshold (Stephenson et al 1987; Birenbaum et al 1988; Sawatzky 2005), we see reasonable agreement with a theoretical calculation performed by Schwamb and Arenhovel (2001) based on retarded one meson exchange with empirical cutoffs in the propagators. Our results show similar agreement to Schwamb and Arenhovel's calculation as Blackston's (2007) results: which were for the same reaction at 14 and 16 MeV, and under the same experimental conditions as our current results.

Author: PRIDHAM, Glen (U)

Co-author: Dr PYWELL, Robert (University of Saskatchewan)

Presenter: PRIDHAM, Glen (U)

Session Classification: (R1-7) Hadronic Structure - DNP / Structure hadronique - DPN

Track Classification: Nuclear Physics / Physique nucléaire (DNP-DPN)