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Comparison of Double-differential Cross Sections

between JENDL/PD-2016.1 and Experimental Data

for Photo-neutron Production

of Medium-heavy Nuclei at 16.6 MeV

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I. Introduction

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Photo-neutron production



 Several MeV photon (γ-ray) interact with nucleus (A), then the nucleus emit neutron (n)

- \Rightarrow Giant dipole resonance
- \Rightarrow Plays important role for shielding design on accelerators

I. Introduction (cont.)

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Energy and angular distribution



- Many data are available for (γ,xn) reaction cross section, but scare for data on energy and angular distribution
 - \Rightarrow Double differential cross section (DDX)
- Our group measure DDXs for Pb, Au, Sn, Cu, Fe, and Ti targets ⇒ Submitted to NIMA, under reviewing
- Evaporation and pre-equilibrium, angular dependence were found

I. Introduction (cont.)

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Japan Atomic Energy Agency

• JENDL/PD2016.1

JENDL Photonuclear Data File 2016 revision 1 (JENDL/PD-2016.1)

Nuclear Data Center

- The photonuclear data set for 2684 nuclides
- CCONE and latest experimental data with laser inverse-Compton scattering photons
- The data consists of photo-absorption, photofission, and particle and residual-nuclide production cross sections, and double-differential cross sections

I. Introduction (cont.) P18 R203

Objective



- The first comparison between experimental and nuclear data on DDXs of medium to heavy targets
 - Provide new data for evaluation of photo-neutron energy and angular distribution
 - Show contributions from evaporation and preequilibrium processes separately

II. Experiment

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III. Result

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IV. Conclusion

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- From the first comparison between experimental data and nuclear data
 - Experimental data on DDX are indispensable for further improvement of nuclear data
 - JENDL/PD-2016.1 reproduce experimental data well for low energy component
- In future
 - Experimental study on the (γ,xn) DDXs with different LCS energies
- **References:**
- [1] Y. Kirihara, et al., J. Nucl. Sci. Tech. Vol.57 (2020), 444-456.
- [2] T.K. Tuyet et al., Presentation 1N13, 2020 Fall meeting of AESJ

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