

## PARTIAL PHOTONUCLEAR REACTION CROSS SECTIONS OBTAINED USING BREMSSTRAHLUNG

Wednesday, 13 July 2022 15:20 (5 minutes)

Cross sections of partial reactions, primarily (g,1n) and (g,2n), are widely used in both scientific researches and applications. There are two main methods for obtaining those in various experiments. The majority of  $CS(g,1n)$  and  $CS(g,2n)$  for was obtained using quasimonoenergetic annihilation photons [1,2] in Livermore (USA) and Saclay (France). The method of photoneutron multiplicity sorting using measured neutron energy was used for direct measurement the cross sections  $CS(g,1n)$  and  $CS(g,2n)$ . For 19 nuclei from 51V to 209Bi investigated in both laboratories significant systematic disagreements were found [3,4]. Using the objective physical criteria of data reliability it was shown that in general partial reaction cross sections obtained using the method of neutron multiplicity sorting are not reliable because the presence of significant systematic uncertainties from the unreliable (erroneous) identification of multiplicity of detected neutron [5]. The most important criteria are that positive ratios  $F_{exp} = CS(g,1n)/CS(g,xn) = CS(g,1n)/[CS(g,1n)+2CS(g,2n)]$  for reliable data in the cases of (g,1n) and (g,2n) reactions must have values not higher than 1.00 and 0.50 and near the values  $F_{theor}$  calculated in the combined photonuclear reaction model (CPNRM). Data on partial reaction cross sections were obtained also using bremsstrahlung. The neutron yield cross sections  $CS(g,xn) = CS(g,1n)+2CS(g,2n)$  were measured directly and used for determination of  $CS(g,2n)$  using the corrections based on the nuclear reaction statistical theory. After that  $CS(g,1n)$  was obtained using the correspondent subtraction procedure  $CS(g,1n) = CS(g,xn)-2CS(g,2n)$ . The reliability of partial reaction cross sections  $CS(g,1n)$  and  $CS(g,2n)$  for nuclei 59Co, 58,60Ni, 90Zr, 112,114,119Sn, 127I, 165Ho, 166Er, 181Ta was investigated using the criteria mentioned above. It was found that generally those cross sections are not reliable because of many physically forbidden negative values or values for which  $F_{2exp} > 0.50$ . This is the results of some shortcomings in GDR statistical theory description of competition between particle reactions.

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### The speaker is a student or young scientist

No

### Section

1. Experimental and theoretical studies of nuclear reactions

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**Session Classification:** Experimental and theoretical studies of nuclear reactions