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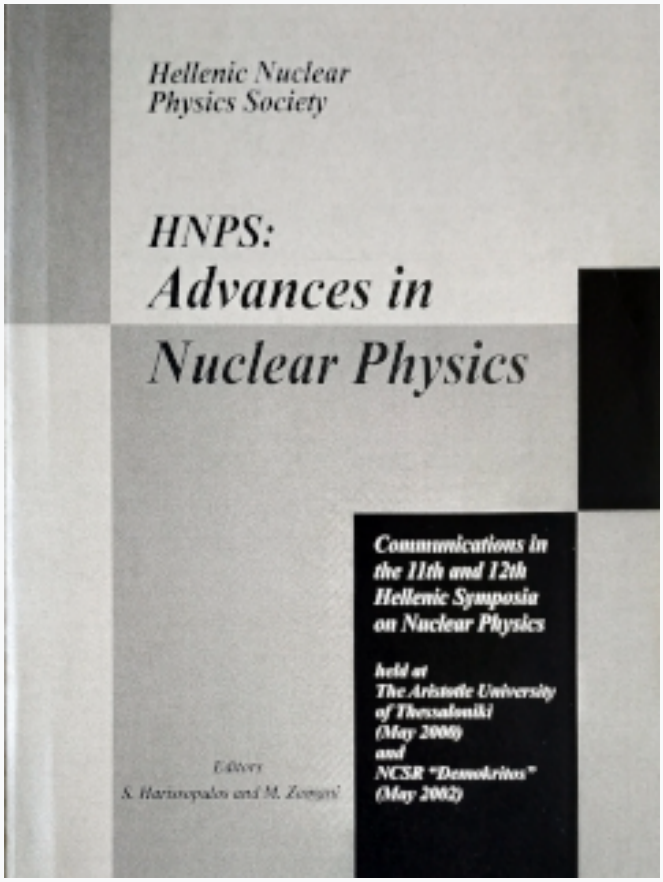

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Statistical model calculations of the ^{232}Th(n,2n) reaction

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Abstract

On the context of the Cern n_TOF collaboration the ^{232}Th(n,2n)^{231}Th reaction cross section has been measured relative to the ^{56}Fe(n,p)^{56}Mn and ^{27}Al(n,α)^{24}Na reaction cross sections by the activation method for neutron energies up to 11 MeV. The neutrons were produced via the ^{2}H(d,n) reaction using a deuterium filled gas-cell, at the 5.5MV TANDEM Accelerator of NCSR "Demokritos". In addition to the experimental work, theoretical Statistical model calculations have been performed using the computer code STAPRE/F. The code STAPRE is designed to calculate energy averaged cross sections for particle induced nuclear reactions with several emitted particles and gamma rays under the assumption of sequential evaporation. For the first evaporation step preequilibrium emission is taken into account while population of states resulting from the first equilibrium evaporation step is calculated using the Hauser-Feschbach theory. Fission process competition is also taken into account in the evaporation steps. Sensitive parameters for the calculation, like level density parameters, have been adopted after fitting experimental data for the competing (n,f) reaction. The results are being compared to the experimental data.

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