

Experimental α -induced reaction cross sections on ^{197}Au

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The so-called γ -process [1] is responsible for the production of the majority of the proton rich stable nuclei which are unreachable by the neutron capture reactions in the heavy element nucleosynthesis. The γ -process network calculations still fails to reproduce the observed abundances partially due to their uncertain nuclear physics input. These inputs are provided by statistical model calculations which need to be validated. To maximize the experimental constrain on the stellar rate entering into the reaction network calculation, charged particle capture reaction cross sections have to be measured [2,3]. The database of such reactions are growing, but still scarce [4].

This work presents alpha capture reaction cross section measurements on ^{197}Au . Beside the radiative capture the (α, n) and $(\alpha, 2n)$ reactions was also investigated. Since the reaction products are radioactive the activation technique was employed using γ - and X-ray countings [5]. Thanks to the high sensitivity of the X-ray counting method, 1.5 orders of magnitude lower radiative capture cross section and 2 orders of magnitude lower (α, n) cross sections was successfully measured, compared to the recent precision dataset in the literature [6].

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