

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 09 June 2016

17:00 -18:00

3rd Floor Seminar Room

**"Capture reactions for the modelling of the p-process
of explosive nucleosynthesis"**

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Abstract

The p process nucleosynthesis is responsible for the production of 35 stable neutron-deficient nuclei heavier than iron observed in the solar system. The most favored p-process scenarios involve a series of photodisintegration reactions of intermediate and heavy elements at high temperatures (2–3 billion degrees Kelvin) that can be achieved only during the explosive burning phases of massive stars. The relevant abundance calculations involve extended networks of more than 20000 reactions, a very small fraction of which can or have been measured in the laboratory. As a result, the calculations rely largely on predictions of the statistical model which have shown to depend strongly on the nucleon-nucleus and α -particle-nucleus optical model potential. Considerable effort has been devoted in recent years to improve our knowledge of the behavior of the α -nucleus OMP at energies relevant to p-process. Recently, the 4π γ -summing method was developed by the group of "Demokritos". Using this new method, cross sections of more than 20 (p, γ) and (α , γ) reactions were determined at energies within the Gamow window. A review of recent experimental and theoretical developments will be presented. Finally, the question of whether there is sufficient experimental information to put constraints on the theory and draw final conclusions will be discussed.