Istituto Nazionale di Fisica Nucleare
codice fiscale 84001850589

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Progetto per borse CSN3 per gli studenti della laurea triennale	
Titolo del progetto:	^{24}Mg+γ
Esperimento/Sigla proponente:	ASFIN2
Laboratorio ospitante:	LNS
Contact person presso il laboratorio	G.L. Guardo
Descrizione attività (max 1000 caratteri):	Silicon burning sets the chemical composition of a star right before the core collapse and the subsequent supernova explosion, thus constituting a key process for the understanding of core-collapse supernovae. Sensitivity studies show that the ^{24}Mg(γ,α)^{20}Ne reaction governs the downward flow from ^{24}Mg to ^{4}He, thus determining the effective rate of ^{28}Si destruction, making its reaction rate critically important to stellar models. At present, the ^{24}Mg(γ,α)^{20}Ne reaction rate has been calculated from the ^{20}Ne(α,γ)^{24}Mg rate that in the temperature range of interest may be subject to systematic errors of the order of a factor of 2. A direct ^{24}Mg photodissociation measurement using gamma beams of energies 10-12 MeV will allow us to determine a much more accurate cross section to be used in nuclear reaction network calculations to improve the knowledge of the pre-supernova chemical composition. For this reason, a new direct measurement of the reaction cross section at astrophysical energies using the Compton backscattered gamma beam available at the High Intensity Gamma-Ray Source (HIγS) will be performed. In the research activity, the GROOT code will be used to analyze the solid-angle coverage and the angular and energy straggling of the target together with resolution of detectors and gamma beam energy spread and emittance in order to determine the best setup for the experiment.
Altre indicazioni (max 500 caratteri):	Basic knowledge of C++, GEANT4 and ROOT
Facility che il laboratorio ospitante mette a disposizione:	Buoni pasto Postazione di lavoro Computer e programmi per analisi dati e simulazioni
Note:	L'esperienza svolta presso il laboratorio ospitante può essere parte integrante della attività richiesta per un progetto di tesi magistrale.