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New progress in the experimental studies of the ^{46}Mn β^+ decay channel

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The ^{44}Ti nucleosynthesis takes place in Core Collapse Supernova (CCSN) explosions, the final process suffered by stars with initial mass greater than 8 $M_\odot$. This, alongside its characteristic gamma decay chain, turns the isotope into a good gamma tracer of Supernovae events. Besides, the comparison between observations and models of the synthesized ^{44}Ti in CCSN gives important constraints to the models in which reaction networks are used for modeling nucleosynthesis occurring in the last stages of those stars with thermonuclear reaction rates as its inputs [1,2,3].

Indirect methods, such as the β-delayed proton emission, may help us to approach narrow isolated resonances which are very difficult to study in a direct way by the current nuclear laboratories. This is the case of the ^{45}V(p,γ)^{46}Cr reaction, one of the candidates to be sensitive to the nucleosynthesis of ^{44}Ti in CCSN explosions [1,4,5].

In the current work, we present the advances achieved at analyzing the ^{45}V(p,γ)^{46}Cr reaction by means of the ^{46}Mn β^+ decay channel. For that purpose and to study the excited states of his daughter nucleus ^{46}Cr, the ^{46}Mn was selected among other species in the cocktail beam delivered by LISE fragment separator at GANIL (Caen, France). As part of our results, we present the proton and gamma emission peaks related to the ^{46}Mn decay and compare them with the work from references [6,7]. Also, we present a p-γ coincidence study to identify the processes linked to the γ emission. Furthermore, we compare the intensities obtained from the γ peaks with those of previous works [6].

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Primary author: Mr GODOS VALENCIA, David (IF-UNAM, CEAFMC - Universidad de Huelva)

Co-authors: Dr ACOSTA, Luis (IF-UNAM, Instituto de Estructura de la Materia - CSIC); Dr ASCHER, Pauline (LP2i-Bordeaux); BLANK, Bertram (LP2i-Bordeaux); Dr GIOVINAZZO, Jérôme (LP2i-Bordeaux); Dr DE OLIVEIRA, Francois (GANIL); Dr FOUGÈRES, Chloé (Argonne National Laboratory); SÁNCHEZ BENÍTEZ, Ángel Miguel (CEAFMC - Universidad de Huelva)

Presenter: Mr GODOS VALENCIA, David (IF-UNAM, CEAFMC - Universidad de Huelva)

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