

Level structure study of ^{27}Si relevant to the $^{26}\text{Al}(p,\gamma)^{27}\text{Si}$ reaction

Hanane Mebrek,¹ Mouna Bouhelal,² and Derradji Bahloul¹

¹*PRIMALAB Laboratory; Departement of Physics, University of Batna 1,*

Avenue Boukhloufa M El Hadi, 05000 Batna, Algeria

²*Laboratoire de Physique Appliquée et Théorique,*

Larbi Tebessi University, Tébessa 12022, Algeria

The major challenge in nuclear astrophysics is to find ways to determine reaction rates at excitation energies relevant for burning in the stellar environment. These rates depend upon the spectroscopic properties of states in the produced nucleus. The most studied reactions are radiative proton-capture, (p,γ) reaction.

We are interested to the study of $^{26}\text{Al}(p,\gamma)^{27}\text{Si}$. The J^π assignments of states in ^{27}Si above the proton threshold energy ($S_p=7463$ keV) over $E_x=7,0-8,1$ MeV [1] play a crucial role in the calculation of the reaction rate .

We calculated, using the PSDPF interaction [2], the spectroscopic properties of levels in ^{27}Si . The $^{26}\text{Al}(p,\gamma)$ reaction rate and spectroscopic factors were also calculated. A detailed discussion of the comparison of our results to experimental available data will be presented.

[1] A. Parikh, et al., Phys. Rev. C **84**, 065808 (2011).

[2] M. Bouhelal, et al., Nucl. Phys. A **864**, 113 (2011).