# RESONANT BEHAVIOUR OF $^{24}Mg(^{12}C,\alpha_o)^{32}S$ REACTION IN THE ENERGY RANGE 21.8 - 26.0 MeV

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Evidence for intermediate structure was reported[1] for the $^{12}C+^{24}Mg$ system. This evidence is based on measurements at $\theta_{c.m}=180^o$ of excitation functions in elastic channel and two inelastic channels corresponding to first $2^+$ state of $^{24}Mg$ and to first $2^+$ state of $^{12}C$, within the energy range 11-27 MeV c.m. A strong correlation was found between these channels the cross correlation coefficients being respectively 0.33,0.37 between g.s. and first $2^+$ of $^{24}Mg$ and first $2^+$ of $^{12}C$ and 0.01 between the two $2^+$ states. Also strong correlation was found with $^{24}Mg(^{12}C,\alpha)$ channels measured at Los Alamos[2] in the energy range 27.5-35.0 MeV at $5^o$lab and with the channel $^{24}Mg(^{12}C,\alpha_1)$ measured at Athens[3] at $13^o$lab in the energy range 16.5 - 28.5 MeV.

In the present contribution we are reporting results on excitation function measurement of $^{24}Mg(^{12}C,\alpha_o)^{32}S$. This channel corresponds to $^{32}S$ in its ground state. In the experiment a $^{12}C$ beam of the Bucharest Tandem accelerator and a $\sim 60 \mu g/cm^2$ $^{24}Mg$ target, deposited on a thin gold support were used. The alpha particles were detected at $\theta=5^o$lab by the aid of a 1 mm thick Si(Li) detector. In order to discriminate the alpha particles against the large background due to the incident $^{12}C$ beam a gold foil 38.7 $mg/cm^2$ thick was placed in the front of the silicon detector. The $\alpha$ particle identification was checked by observing the energy shift of the peak of interest when an additional 15 $mg/cm^2$ tantalum foil was added to the gold filter. The overall FWHM energy resolution including target thickness was 300 KeV, good enough to discriminate $\alpha_o$ particles against $\alpha_1$ particles which are 2.4 MeV apart. The monitoring of the

beam was performed by detecting at $\theta=45^{o}$ the $^{12}C$ beam scattered on the target. In fig.1 there is shown the excitation function for the $^{24}Mg(^{12}C,\alpha_o)^{32}S$ channel between 21.8 and 26. MeV. In fig.1 there is also displayed the excitation function for elastic scattering measured previously[1]. It appears a correlation of the structures in both excitation functions. It was calculated the cross correlation coefficient R(1,2) defined as

$$R(1,2) = \frac{\sigma_1(E)\sigma_2(E)}{\sigma_1(E)> < \sigma_2(E)>} - 1$$

The obtained value is R(1,2) = 0.10 supporting a strong correlation between the two channels.

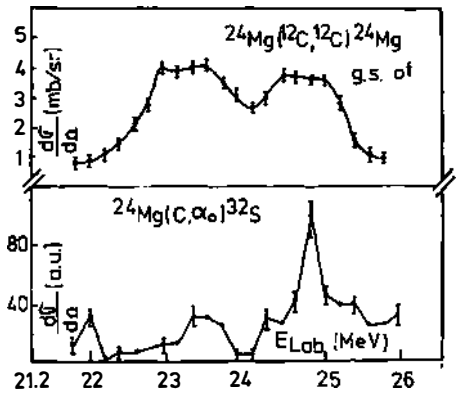


Fig.1

No attempt was made to measure angular distribution on a particular structure since it was recently shown[4] based on complete phase shift analysis of several elastic scattering distributions, on the maximum of resonant structures, that no spin assignment can be made. The reason is the superposition to the intermediate structure of a more complex statistical resonance noise.

## References

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