Radiative alpha capture on ^{7}Be with DRAGON at energies relevant to the νp-process

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The origin of about 35 neutron–deficient stable isotopes with mass number A $>$74, known as the *p*–nuclei, has been a long-standing puzzle in nuclear astrophysics. The ν*p*–process is a candidate for the production of the light *p*–nuclei, but it presents high sensitivity to both supernova dynamics and nuclear physics [1, 2]. It has been recently shown that the breakout from *pp*-chains through the ^{7}Be$(\alpha,\gamma)^{11}$C reaction, which occurs prior to ν*p*-process, can significantly influence the reaction flow, and subsequently the production of *p*-nuclei in the 90 $<$A$<$110 region [2]. Nevertheless, this reaction has not been studied well yet in the relevant temperature range - T= 1.5–3 GK. To that end, the first direct study of important resonances of the ^{7}Be$(\alpha,\gamma)^{11}$C reaction with unknown strengths using DRAGON [3] was recently performed at TRIUMF. The reaction was studied in inverse kinematics using a radioactive ^{7}Be ($t_{1/2}$= 53.24 d) beam provided by ISAC-I and two resonances above the ^{11}C α–separation energy - $Q_{\alpha} = 7543.62$ keV - were measured. The experimental details, in particular how the recoil transmission and BGO efficiencies were accounted for considering the large cone angle for this reaction, will be presented and discussed alongside some preliminary results.

References

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