

E566 and E518: γ -ray spectroscopy of $^{11}_{\Lambda}\text{B}$ and $^{12}_{\Lambda}\text{C}$

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In E566, we carried out a γ -ray spectroscopy study for $^{12}_{\Lambda}\text{C}$ and $^{11}_{\Lambda}\text{B}$. These hypernuclei were produced via $^{12}\text{C}(\pi^+, \text{K}^+)^{12}_{\Lambda}\text{C}$ and $^{12}_{\Lambda}\text{C} \rightarrow ^{11}_{\Lambda}\text{B} + \text{p}$ reactions employing the K6 line and SKS, and their γ -transitions were detected with Hyperball2 (Fig.1), an upgraded version of the Ge detector array, Hyperball.

Figure 2 (left) shows a preliminary γ -ray spectrum after selecting the p_{Λ} -states of $^{12}_{\Lambda}\text{C}$, which corresponds to the production of $^{11}_{\Lambda}\text{B}$. The γ -ray peak for the M1 ($7/2^+ \rightarrow 5/2^+$ g.s.) transition of $^{11}_{\Lambda}\text{B}$ was observed at 263 keV. This energy gives the strength of the ΛN spin-spin interaction. In addition, a γ -ray peak was observed at 2.67 MeV when the s_{Λ} -states of $^{12}_{\Lambda}\text{C}$ were selected (Fig. 2 right). It is assigned to the $1^- \rightarrow 2^-$ transition in $^{12}_{\Lambda}\text{C}$ as shown in Fig. 3.

In E518, we observed six γ -ray transitions in $^{11}_{\Lambda}\text{B}$ via the $^{11}\text{B}(\pi^+, \text{K}^+)^{11}_{\Lambda}\text{B}$ reaction but four of them were not able to be assigned. Combined with the new E566 data, one of them was assigned as $7/2^+ \rightarrow 5/2^+$ g.s. and the level scheme has been partly constructed as shown in Fig.3.

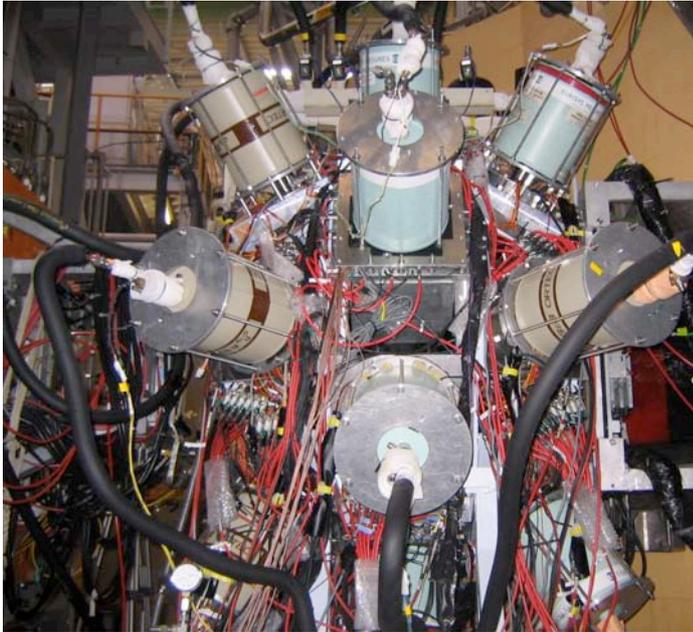


Fig. 1: Hyperball2.

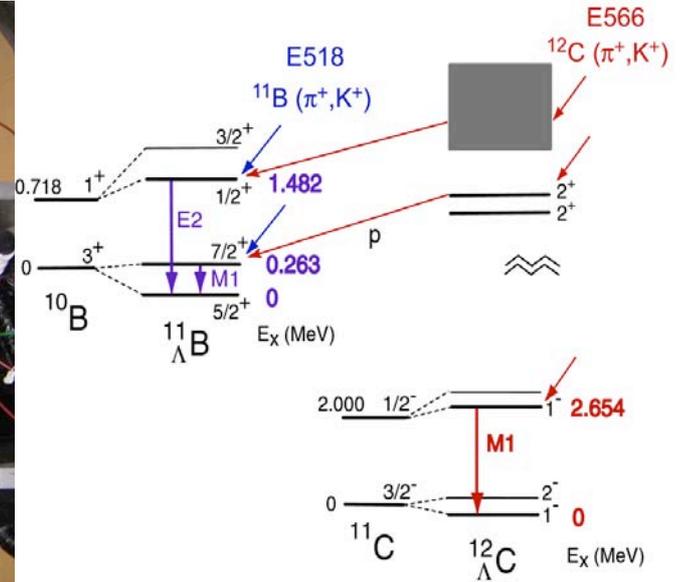


Fig. 3: Level schemes of $^{11}_{\Lambda}\text{B}$ and $^{12}_{\Lambda}\text{C}$.

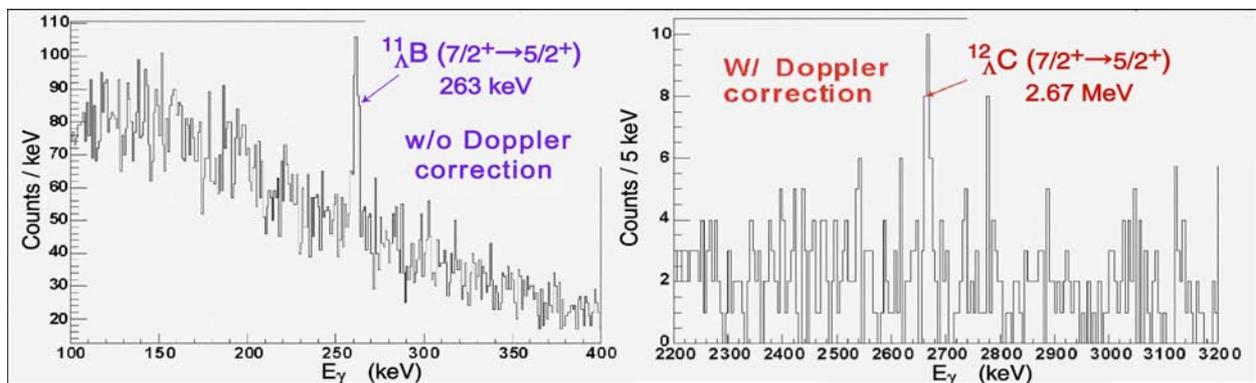


Fig. 2: γ -ray spectra for $^{11}_{\Lambda}\text{B}$ and $^{12}_{\Lambda}\text{C}$ measured in E566.