

Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

γ -ray spectroscopy of ${}_{\Lambda}^{12}\text{C}$ and ${}_{\Lambda}^{11}\text{B}$ via the Hyperball2 array SARI KINOSHITA, Dept.of Phys.Tohoku Univ., E566 COLLABORATION — Based on the success of a series of Hyperball experiments, an upgrading of Hyperball has been undertaken. The new array, Hyperball2, houses six Clover-type detectors, which are segmented into four Ge crystals, plus 14 single-crystal Ge detectors. Each detector is surrounded by BGO scintillator counters for a reduction of backgrounds in γ -ray spectrum by vetoing contaminated events. The photo-peak detection efficiency of Hyperball2 is nearly doubled from that of the previous array. We examined the performance at Tohoku Univ. CYRIC. The first experiment of Hypernuclei with this array, in conjunction with Superconducting Kaon Spectrometer (SKS), is scheduled at the KEK beam facility to perform γ -ray spectroscopy of ${}_{\Lambda}^{12}\text{C}$ and ${}_{\Lambda}^{11}\text{B}$ using the (π^+, K^+) reaction on ${}^{12}\text{C}$ target. In this experiment, one of the main goals is to measure a lifetime of $7/2^+$ state in ${}_{\Lambda}^{11}\text{B}$, which is selectively produced via one proton emission decay of ${}_{\Lambda}^{12}\text{C}(2^+)$. The measured lifetime, by means of Doppler shift attenuation method, determines the reduced transition probability of the ${}_{\Lambda}^{11}\text{B}(7/2^+ \rightarrow 5/2^+)$ Λ -spin-flip M1 transition ($\text{B}(\text{M1}; 7/2^+ \rightarrow 5/2^+)$). Properties of a Λ particle in free space may change in nuclear matter and the magnetic moment is one of them. The measurement of the $\text{B}(\text{M1}; 7/2^+ \rightarrow 5/2^+)$ value will provide a quantitative account for the change of the magnetic moment of a Λ if at all. Equally as important, strengths of the ΛN interaction can be inferred from excited energy levels of ${}_{\Lambda}^{12}\text{C}$.

Sari Kinoshita
Dept.of Phys.Tohoku Univ.

Date submitted: 18 Aug 2005

Electronic form version 1.4