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Pulse structure dependence of proton spin polarization rate TOMOMI KAWAHARA, Department of Physics, Toho University, TOMOHIRO UESAKA, YOUHEI SHIMIZU, Center for Nuclear Study, Graduate School of Science, University of Tokyo, SATOSHI SAKAGUCHI, RIKEN, TAKASHI WAKUI, Cyclotron and Radioisotope Center, Tohoku University — A polarized proton solid target for RI beam experiments has been developed at Center for Nuclear Study, University of Tokyo [1]. The proton is polarized by transferring population difference in photo-excited triplet states of aromatic molecule. Through this method proton polarization of about 20% have been obtained at 0.1 T and in 100 K. Although this target has been successfully applied to RI beam experiments [2,3], further improvement in the polarization is desirable for future applications. To pursue possible improvement in photo-excitation power, we have examined pulse-structure dependence of proton polarization rate. The excitation light is provided by a cw Ar-ion laser and pulsed by an optical chopper. We have found that proton polarization depends strongly on the pulse structure and the optimum condition is found to be a duty factor of 50% and a repetition frequency of 10 kHz. At this condition, the polarization rate can be increased by a factor 2.5 or more compared with the old settings, where a duty factor and a repetition frequency were 5% and 2.5 kHz, respectively. [1] T. Wakui et al., Nucl. Instrum. Methods A 550 (2005) 521. [2] M. Hatano et al., Eur. Phys. J. A 25 (2005) 255. [3] S. Sakaguchi et al., CNS Annual Report 2006 (2007).

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