Pulse structure dependence of proton spin polarization rate TO-MOMI KAWAHARA, Department of Physics, Toho University, TOMOHIRO UE-SAKA, 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 pursuit 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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