Contribution ID: **58** Type: **not specified**

La-139 polarized target study for NOPTREX

Monday, 23 September 2019 11:40 (20 minutes)

In the ^{139}La(n,γ)^{140}La reaction, a T-violating asymmetry is expected to be enhanced by about 6 orders of magnitude[1]. NOPTREX (Neutron Optics for Parity and Time Reversal EXperiment) collaboration is planning to search for the T-violation in this reaction, where a polarized target of ^{139}La nuclear spin is indispensable. Basically, we are keeping two choices, Brute Force (BF) and Dynamic Nuclear Polarization (DNP) for realizing the polarized target, but each of them has some difficulties.
The BF method needs an advanced and complex cryogenic system. Achieving the 50% polarization in ^{139}La, for example, requires the high magnetic field of 17 T and the low temperature of 10 mK.
The DNP do not need such hard cryogenic system, but strongly depends on characteristics of the target materials. The single crystal of Nd3+:LaAlO3 is promising target material because the crystal structure enables us to suppress the quadrupole relaxation and to give a sufficiently narrow linewidth in an ESR spectrum, which are essential for performing the DNP [2].
Since 2018, we have started to study the physical properties of $LaAlO_3$ crystal in Tohoku University and to prepare cryogenetic system for DNP study in RCNP.
In this presentation, we will report the current status of ^{139}La polarized target study for the T-violation search.

References
[1] T. Okudaira, et. al., Phys. Rev. C 97, 034622 (2018).
[2] Y. Takahashi, H.M. Shimizu, and T. Yabuzaki, Nucl. Instrum. Methods Phys. Res. A Vol. 336 Issue 3, p.p. 583-586 (1993).

Summary

NOPTREX collaboration is planning to search for T-violation in ^{139}La(n,γ)^{140}La. Recently, we have started the project for developing ^{139}La polarized target. In this presentation, we will report the current status of this project.

Primary author: Mr ISHIZAKI, Kohei (Nagoya Univ.)

Co-authors: Dr SHIMIZU, Hirohiko M. (Nagoya Univ.); Dr KITAGUCHI, Masaaki (Nagoya Univ.); Dr IINUMA, Masataka (Hiroshima Univ.); Dr KOHRI, Hideki (Osaka Univ. RCNP); Mr YOSHIKAWA, Hiromoto (Osaka Univ. RCNP); Dr IWATA, Takahiro (Yamagata Univ.); Dr MIYACHI, Yoshiyuki (Yamagata Univ.); Dr ISHIMOTO, Shigeru (KEK); Dr FUJITA, Masaki (Tohoku Univ. IMR); Dr IKEDA, Yoichi (Tohoku Univ. IMR)

Presenter: Mr ISHIZAKI, Kohei (Nagoya Univ.)

Session Classification: Solid Polarized Targets

Track Classification: Solid Polarized Targets