

Development of a liquid ^3He target system for experimental studies of antikaon-nucleon interaction at J-PARC

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We have successfully developed a liquid ^3He target system for two experiments at the J-PARC hadron facility; an x-ray spectroscopy of kaonic helium [2] and a search for antikaon nuclear bound states [3]. In these experiments we need to measure secondary charged particles from the ^3He target by a cylindrical detector system with a large solid angle. We adopted an L-shape cryostat to separate the target cell away from main cryogenic components, such as a heat exchanger and a ^4He evaporator. A total amount of 380 liter of gaseous ^3He at room temperature was condensed by a heat contact with decompressed liquid helium-4 at 1.3 K. For the safety operation and maintenance, a gas handling system was produced to store, transfer and recover the ^3He gas. The achieved temperature of the ^3He target is around 1.3 K with a liquid ^4He consumption of 50 liter / day.

In this contribution, we present a detail of the liquid ^3He target system together with the operational result in the beam time in May 2013.

References

- [1] M. Iio et al., Nucl. Instrum. Meth. A687(2012)1.
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