

Present status of the liquid-helium supply and recovery system

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The liquid-helium supply and recovery system,¹⁾ which can produce liquid helium at a liquefaction rate of 200 L/h from pure helium gas, had been under stable operation since the beginning of April 2001. As operation failure due to deterioration over time has increased in recent years, duplication of liquefier was conducted in 2017. The new liquefier can produce liquid helium at a liquefaction rate of 220 L/h from pure helium gas. Consequently, even when the liquefier breaks down, it can be repaired without stopping the supply of liquid helium.

The volumes of liquid helium supplied each year from 2001 to 2017 are shown in Fig. 1. From 2001 to 2013, there was a gradual increase in the supplied volume, with two declines in 2009 and 2011. In 2014, the supplied volume decreased owing to a malfunction in the system. However, in 2015, the supplied volume returned to its original value. In 2016, the supplied volume decreased but slightly increased in 2017.

The purity of helium gas recovered from the laboratories gradually improved after the new system was constructed. At present, the impurity concentration in the recovered gas rarely exceeds 200 ppm. The volume of helium gas recovered from each building in the Wako campus as well as the volume transported to the liquid helium supply and recovery system were measured. The recovery efficiency, which is defined as the ratio of the amount of recovered helium gas to the amount of supplied liquid helium, was calculated. The recovery efficiency for the buildings on the south side of the Wako campus, namely the Cooperation Center building of the Advanced Device Laboratory, Chemistry and Material Physics building, and Nanoscience Joint Laboratory building, increased to more than 85%.

Reference

- 1) K. Ikegami *et al.*, RIKEN Accel. Prog. Rep. **34**, 349 (2001).

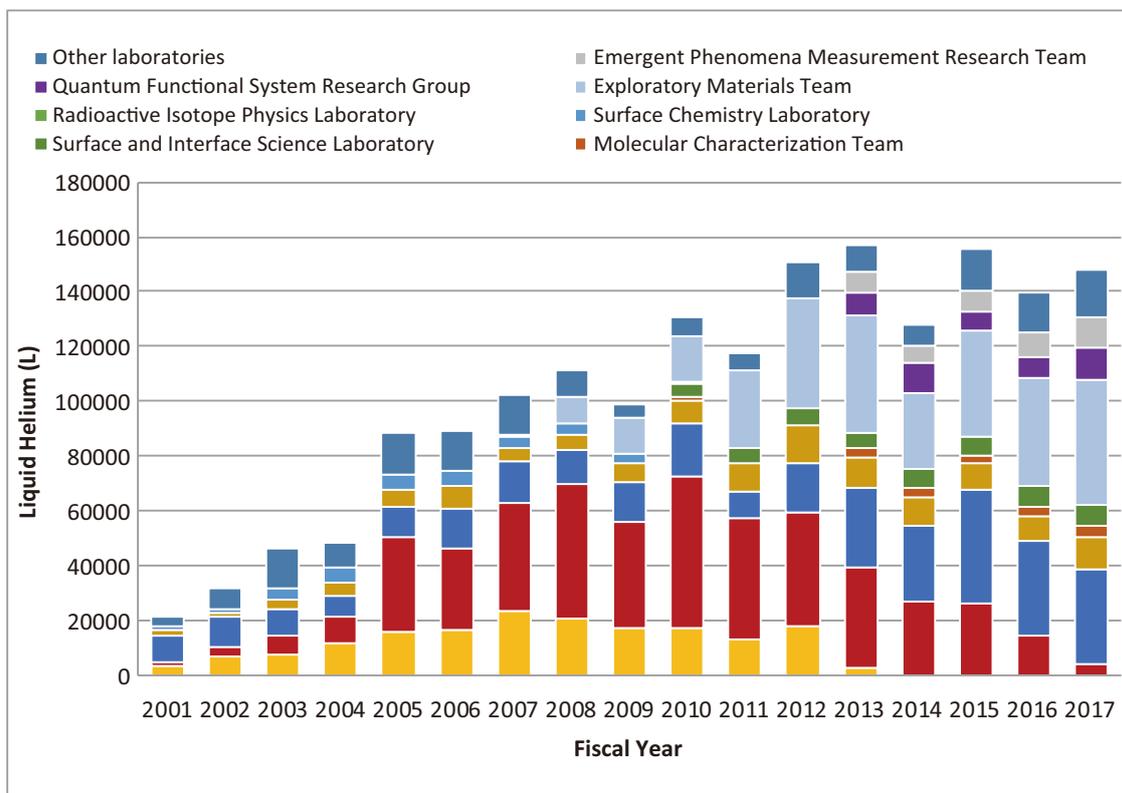


Fig. 1. Volumes of liquid helium supplied to the various laboratories for each fiscal year from 2001 to 2017.

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