

RILAC operation

K. Oyamada,^{*2} E. Ikezawa,^{*1} M. Kase,^{*1} T. Nakagawa,^{*1} N. Sakamoto,^{*1} H. Okuno,^{*1} N. Fukunishi,^{*1} Y. Watanabe,^{*1} M. Komiyama,^{*1} A. Uchiyama,^{*1} T. Maie,^{*1} M. Nagase,^{*1} M. Fujimaki,^{*1} T. Watanabe,^{*1} H. Hasebe,^{*1} H. Imao,^{*1} K. Ozeki,^{*1} K. Suda,^{*1} Y. Higurashi,^{*1} K. Yamada,^{*1} S. Watanabe,^{*1} M. Kidera,^{*1} T. Nagatomo,^{*1} K. Kumagai,^{*1} T. Nishi,^{*1} T. Ohki,^{*2} H. Yamauchi,^{*2} M. Tamura,^{*2} A. Yusa,^{*2} K. Kaneko,^{*2} and O. Kamigaito^{*1}

The RILAC saw the commissioning of a superconducting RILAC (SRILAC) from January to March 2020. Some statistics regarding the operation of RILAC from January 1 to December 31, 2020 are presented in Table 1. Table 2 lists the beam service times in the standalone mode of RILAC in 2020. The details are described elsewhere in this progress report.

We performed the following maintenance works during the reporting period.

- (1) In the radio-frequency(rf) systems, DC high-voltage power supplies were subjected to annual inspection. The major components with mechanical parts were subjected to simple inspection.
- (2) The water pumps were subjected to simple inspection. All cooling towers were subjected to monthly inspection.
- (3) All turbomolecular pumps were subjected to simple inspection. Cryogenic pumps used for cavities No. 1, No. 2, A1, and A2 were overhauled.
- (4) All magnet power supplies were subjected to simple inspection.

Table 1. Statistics of RILAC operation from January 1 to December 31, 2020.

Operation time of RILAC	2878.3 h
Mechanical problem	161.3 h
Standalone RILAC	1970.6 h
Injection into RRC	0.0 h
Total beam service time of RILAC	1970.6 h

We faced the following mechanical problems during the reporting period.

- (1) The cooling parts of drift tubes in RILAC cavities No. 2, No. 4, and No. 5 had a coolant leak. We repaired the parts with a repair material.
- (2) The plate DC power supply for a tetrode (SIEMENS-RS2012CJ) in the rf amplifier of RILAC No. 5 malfunctioned. It was fixed by replacing the electric parts.
- (3) Water was found to have splashed in the rf power feeder of RILAC cavity No. 1 because of leakage from a cooling pipe for the coaxial conductor. We replaced it with new ones.
- (4) The water cooling pipe of the RFQ cavity had a water leak. We repaired the cooling pipe with a repair material.
- (5) A section of the air-pressure pipe for the contact fingers of the rf shorting plate in RILAC cavity No. 6 had a vacuum leak because of a deteriorated O-ring. We replaced it with a new one.

Table 2. Beam service times of RILAC in the standalone mode in 2020.

Beam course	Total time (h)	%
e11	997.37	50.6
e2	973.23	49.4
Total	1970.60	100.0

^{*1} RIKEN Nishina Center

^{*2} SHI Accelerator Service Ltd.