

RILAC operation

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The RIKEN heavy-ion linac (RILAC) has been operated throughout the reporting period and it has supplied various ion beams for different experiments. Some statistics regarding the operation of RILAC from January 1 to December 31, 2017 are presented in Table 1. The total beam service time of the RILAC accounted for 77.6% of its operation time. The two operation modes of the RILAC, namely the standalone mode and the injection mode, in which the beam is injected into the RIKEN Ring Cyclotron (RRC), accounted for 77.7% and 22.3% of the total beam service time of the RILAC, respectively. For experiments, a 2.675-MeV/nucleon ⁴⁸Ca-ion beam accelerated by the RILAC was injected into the RRC from March 25 to April 2. Table 2 lists the beam service times in the standalone mode of the RILAC, which were allotted to the e2 and e3 beam courses in target room no. 1 in 2017. The e2 beam course was used in experiments with GARIS2. The e3 beam course was used in experiments with GARIS. Table 3 lists the operation time of the 18-GHz ECR ion source in 2017.

We performed the following overhauls during the reporting period.

- (1) In the RF systems, the DC high-voltage power supplies were subjected to annual inspection. The major components with mechanical parts were subjected to simple inspection.
- (2) All the cooling towers were subjected to monthly inspection and annual cleaning.
- (3) All the turbomolecular pumps were subjected to annual inspection.

We faced the following mechanical problems during the reporting period.

- (1) Water was found to have splashed in the end drift tube of the Charge-State Multiplier (CSM) A3 and in the trimmer of the CSM A3 cavities because of leakage from each cooling pipe. As a stopgap measure, we repaired the pipes with a repair material.
- (2) The RILAC no. 5 cavity had a vacuum leak because of a deteriorated O-ring. We will replace the O-rings of the cavities in 2018.

Table 1. Statistics of RILAC operation from January 1 to December 31, 2017.

Operation time of RILAC	1592.2 h
Mechanical problems	190.9 h
Standalone RILAC	959.9 h
Injection into RRC	275.9 h
Total beam service time of RILAC	1235.8 h

Table 2. Beam service time of the standalone RILAC allotted to each beam course in target room no. 1 in 2017.

Beam course	Total time (h)	%
e2	794.9	82.8
e3	165.0	17.2
Total	959.9	100.0

Table 3. Operation time of the 18-GHz ECR ion source in 2017.

Ion	Mass	Charge state	Total time (h)
O	18	5	74.7
F	19	6	117.3
Ne	22	6	61.9
Mg	26	7	48.3
Si	30	8	57.4
S	34	10	58.1
Ar	40	11	120.0
Ca	48	10,11	296.8
Ti	50	11, 12, 13	1090.0
Xe	136	26	96.0
Au	197	28	72.0
Total			2092.5

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