

2020 operational report for the Nishina RIBF water-cooling system

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Operation Condition

As the COVID-19 pandemic affected the operation of the cooling systems of Nishina and RIBF in FY2020, the RIBF operation planned for the H1 term was completely cancelled. In FY2020, RIBF's cooling systems were operated for approximately two and half months, and Nishina's cooling systems for AVF-standalone, AVF + RRC, AVF + RRC + IRC and RILAC2 + RRC + GARIS-II were operated for approximately five months. No significant troubles that could cause the long-term interruption of accelerator operation occurred, and the cooling systems operated stably, with the exception of some minor problems.

Trouble Report

In troubleshooting, the symptoms were fortunately minor. Therefore, instead of interrupting the machine time for repairs, while providing emergency measures, repairs such as the switching of beams or summer maintenance were performed during the long-term accelerator outage period. The typical examples of troubles that occurred in FY2020 are a water leak from the cooling plumbing joint and deterioration of cooling water purity due to water leakage, failure in the cooling water pump motor bearing, failure in the control instrumentation air compressor, and device outages caused by an instantaneous voltage drop due to a lightning strike (1–2 times a year).

Periodic Maintenance

Although the operation time was shorter overall because the COVID-19 pandemic, regular maintenance was conducted as planned. As we report it every year, we omit details about the periodic maintenance

Upgrades

The construction of cooling systems dedicated to the diagnostic device (named "New FC-G01") for high-intensity beams began this year, as planned. After the completion of the construction in March 2021, the construction of the power systems and control systems is planned to start in April 2021 with the goal of starting a comprehensive test run within FY2021. Furthermore, an actual load test using the beam of the equip-

ment for enhancing the RRC cooling capacity, which was completed in 2019, is scheduled for March. If the measurement result is satisfactory, the cooling systems are planned to be used in the operation of RIBF from April 2021. The cooling systems are expected to contribute greatly to the mitigation of the fluctuations in the magnetic field due to temperature variations in the RRC cooling water, which has been the problem for many years.

References

- 1) T. Maie *et al.*, RIKEN Accel. Prog. Rep. **52**, (2018).
- 2) T. Maie *et al.*, RIKEN Accel. Prog. Rep. **59**, (2019).

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