Beam-time statistics of RIBF experiments

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This report describes the statistics of the beam times (BTs) at the RIBF facility in fiscal year (FY) 2018. The BTs are categorized into the following two groups: high-energy-mode and low-energy-mode BTs. In the former mode, the beams are delivered in the acceleration scheme of AVF, RILAC, or RILAC2 → RRC → (fRC → IRC →) SRC, where the accelerators in parentheses can be skipped in cascade acceleration depending on the beam species used. In the latter mode, the acceleration scheme is AVF or RILAC (→ RRC).

The BTs in the high-energy mode were scheduled from May to June and from October to December 2018, considering the restriction of utility-power use, budgetary constraints, the maintenance schedule of the accelerator system and co-generation system, etc. In the series of experiments performed in spring, the primary beam of ^{18}O was provided to users, and the ^{238}U primary beam was provided in autumn. Ten experiments approved by the RIBF Program Advisory Committees (PAC)[1)] with an approved BT of 59 days were conducted. The facility development programs used 3.5 days of BT; these are defined as machine study (MS) experiments. Two PAC-approved experiments had to be canceled due to sudden schedule change caused by accelerator troubles.

The summary of the high-energy-mode BTs in FY2018 is given in Fig. 1 as a bar chart. User time decreased compared to the BT in FY2017; this is mainly due to the startup tuning of the newly-introduced RRC-RF cavities, and troubles of water leakage from the new RF cavities. The total length of the MS is almost as short as the length in FY2017. Even though there remain only few newly-introduced facility device requiring beam tests, the opportunities of machine studies should be promoted as an investment for expanding the potential capability and availability of the facility.

The summary of the low-energy mode is shown in Fig. 2. Here, the BTs are classified based on the accelerator operation modes, i.e., AVF standalone, RILAC standalone, and RRC. In FY2018, the total BT length of the low-energy mode increased compare to that in FY2017 regardless of the RILAC shutdown started in the middle of June 2017 for accelerator upgrade. The relatively longer AVF-standalone time and RRC time are due to the long runs for the transmutation experiment and superheavy element search. It is anticipated that RRC will be mostly used for the superheavy element search experiments until RILAC becomes available again in FY2019.

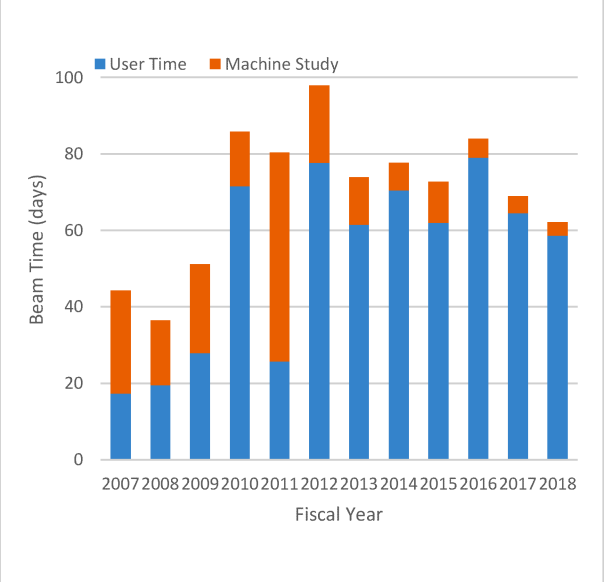

Fig. 1. Bar chart showing the BT statistics for high-energy-mode experiments from FY2007 to FY2018. The accelerator tuning time and Nishina Center mission time are not included.

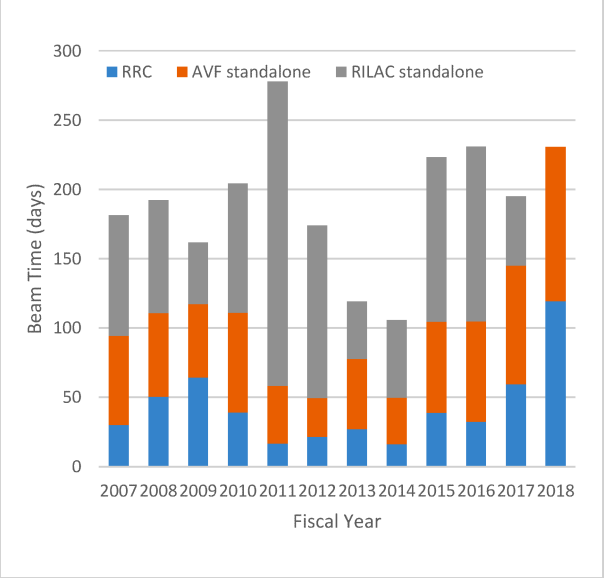

Fig. 2. Bar chart showing the BT statistics for low-energy-mode experiments from FY2007 to FY2018.

Reference

1) K. Yoneda, K. Ishida, H. Yamazaki, N. Imai, Y. Watanabe, K. Yako, H. Miyatake, H. Ueno, in this report.

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