

Nuclear Science and Transmutation Research Division High-Intensity Accelerator R&D Group

1. Abstract

The High-Intensity Accelerator R&D group, consisting of two teams, develops elemental technology of high-power accelerators and high-power targets, aiming at future applications to nuclear transmutations of long-lived fission product into short-lived nuclides. The research subjects are superconducting rf cavities for low-velocity ions, design of high-power accelerators, high-power target systems and related technologies.

Nuclear transmutation with high-intensity accelerators is expected to reduce the high-level radioactive wastes and to recycle the precious resources such as rare-earth materials in future. This method is one of the important applications of the ion-accelerator technologies that have been developed at RIKEN for a long time. Under the framework of ImPACT Fujita Program, we have conducted R&D of elemental technology related to the high-power accelerators and high-power targets, from FY2014 to FY2018. We gained a lot of experiences in these R&Ds. Among them, the development of a superconducting rf cavity has become the basis of the upgrade program of the RILAC facility which started in 2016.

2. Major Research Subject

R&D of elemental technology of high-power accelerators and high-power targets.

3. Summary of Research Activity

- (1) A high-gradient rf cavity has been constructed and tested based on the superconducting rf technology.
- (2) Several candidates for the high-power target have been proposed and their prototypes have been tested.
- (3) A high-current deuteron RFQ has been designed.

Members

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