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Present status and future plans for slow and stopped beams in RIKEN

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The accelerator complex at RIKEN's Nishina Center for Accelerator Based Science offers presently unparalleled intensity and variety of radioactive ion beams. The accelerator complex employs multiple facilities utilizing in-flight fission and fragmentation, fusion, and multi-nucleon transfer reactions to provide radioactive ion beams spanning the table of isotopes from ^{6}He to ^{294}Og. In order to make these beams viable for low-energy experimental techniques (e.g. ion traps) requires the use of high-pressure gas cells. Several such systems are in various states of readiness.

The SHE-mass gas cell, located after the gas-filled recoil ion separator GARIS-II has been successfully operated since 2016. Recent modifications of the SHE-mass system will be discussed and select results presented.

A medium-size gas cell is nearing construction for use in symbiotic measurements. It will be used as a beam dump for in-beam gamma-ray experiments and in conjunction with a multi-reflection time-of-flight mass spectrograph will enhance the in-beam gamma-ray experiments. The design of the system and its planned usage will be discussed.

To provide access to neutron-rich heavy isotopes which are difficult to access via in-flight fission and fragmentation, the KEK Isotope Separation System (KISS) utilizes multi-nucleon transfer reactions. The transfer products are stopped and neutralized in an argon-filled gas cell. Atoms of a desired element can be selectively re-ionized using a two-color resonance laser ionization scheme. Ions of the selected element are accelerated to 30 keV and isobarically purified via a magnetic dipole prior to being delivered to a measurement station. A new "gas-cell cooler-buncher" has recently been installed to efficiently convert the 30 keV beam to be compatible with ion traps. The system will be described and its performance reported.

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