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## Upgrading the ISIS Muon Beamlines

The ISIS muon beamlines have been operating for nearly 40 years and we have recently undertaken a phased programme of refurbishment. We give an overview of the work and performance improvements obtained. The first muon beamline at ISIS started operation in 1987, and in 1993 the EMU and DEVA (now HIFI) ports were added. In 2013 we replaced the front end quadrupole doublet with a larger aperture triplet and in 2016 we replaced the remaining quadrupoles in the original beamline, taking the opportunity to improve the beam optics, and refurbished the other components [1].

The RIKEN beamlines were constructed in 1995 with 3 ports, and Port 4 added in 2002. The refurbishment in 2021-2 involved repairing the magnets, replacing insulators on separators, new water services and modifying the shielding for ease of future maintenance. A replacement for the 30 year old superconducting solenoid is being manufactured.

Both beamlines are now controlled by the ISIS standard "IBEX" control system based on EPICS, which allows automatic initialisation of the beam parameters, logging and alarms, and beam tuning while optimising the data on the instruments. This is particularly useful for configuring the beam momentum and polarity on the RIKEN instruments.

Future beamline developments include the Super-MUSR extension to the MuSR arm. We have other ideas to extend beamlines and move instruments to take advantage of the most suitable beam properties for each.

[1] JPS Conf Proc 21, 011055 (2018)

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No

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