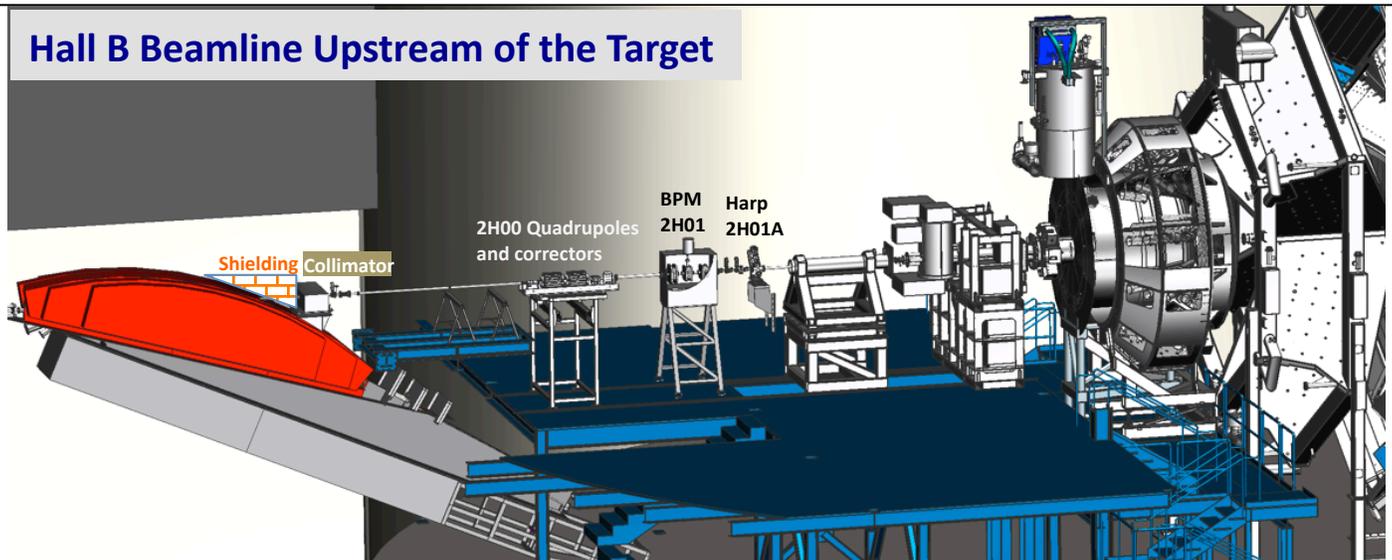


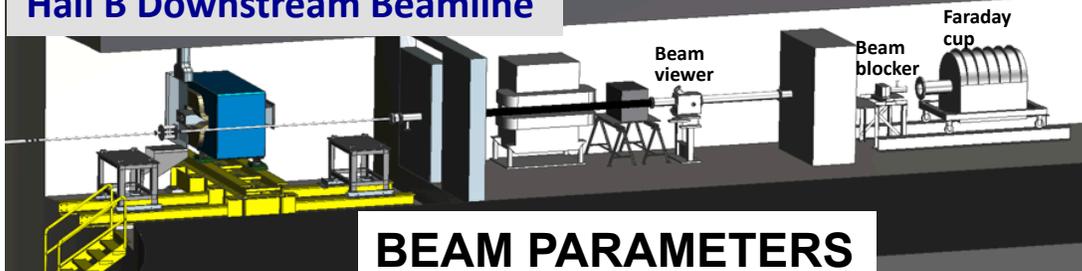
Hall B Beamline

The Hall B beamline has two segments, the so called "2C" line, from the Beam Switch Yard (BSY) to the hall proper, and the "2H" line from the upstream end of the experimental hall to the beam dump in the downstream tunnel, shown below. The beamline instrumentation consists of beam-optics elements, beam position and charge monitors, beam viewers, collimators, shielding, beam profile scanners, and beam halo monitors. Devices that control beam direction, its profile and measure critical parameters are under the accelerator OPS control. Hall B owns collimators, halo monitors, profile scanners, and the viewer.

Hall B Beamline Upstream of the Target



Hall B Downstream Beamline



BEAM PARAMETERS

| PARAMETER | DESIGN VALUE |
|---|---------------------------------|
| Beam energy | ≤ 11 GeV (up to 5 pass) |
| Beam energy spread | $\sim 10^{-4}$ |
| Beam power | ≤ 5000 W (450 A at 11 GeV) |
| Beam current stability | $< 5\%$ |
| Beam size at eth target | ≤ 0.4 mm |
| Beam position stability | ≤ 0.1 mm |
| Beam halo | $\sim 10^{-4}$ of the core |
| Beam polarization | $\sim 80\%$ (if requested) |
| Polarization measurement accuracy | $\sim 3\%$ |
| Helicity correlated charge charge asymmetry | $\sim 0.1\%$ |

- **Construction and Project Leadership:**

Project is lead by JLab, lead scientist S. Stepanyan, with support of University of New Hampshire (UNH). A significant support has been provided by Hall B Slow Controls group, JLab CASA and Engineering Departments, and CEBAF operations. In the design of the beamline significant efforts have been made to protect CLAS12 tracking detectors and their electronics that are mounted in close proximity to beam and target from errant beams and radiation.

- **Significant Dates:**

- A conceptual design of the beamline was completed in 2013.
- Beamline was put together for the first beam operations after 12 GeV upgrade in summer of 2014.
- Two low energy experiments, HPS and PRad, have successfully run in 2015 and 2016 using the beamline in a configuration close to the 6 GeV setup.
- Design of the final beamline components for high energy (>6.2 GeV) operations has been completed in August of 2016.
- A new shielding from Möller electrons for CLAS12 forward detector was designed and installed in December, 2016.
- A new intermediate beam dump, a so called “tagger yoke dump”, was built to be used during the beam tune and Möller runs for high energy beam operations
- The whole beamline setup was successfully commissioned during the CLAS12 KPP run in February 2017 with 6.4 GeV electron beam

- **Project Status:**

The Hall B beamline is ready for safe delivery of high quality beams for experiments with CLAS12. The few remaining work items to be ready for the CLAS12 commissioning and physics run include:

- restoration of the Möller polarimeter (summer 2017)
- commission cryo-target system (summer 2017)

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