

Facilities, Equipment, and Other Resources

The Idaho State University Department of Physics Strategic Plan identifies the use of experimental nuclear physics techniques as its focus area to addressing problems in both fundamental and applied science. The major efforts of the department include fundamental nuclear and particle physics, nuclear reactor fuel cycle physics, nuclear non-proliferation and homeland security, accelerator applications, radiation effects in materials and devices, and biology. One of the key ingredients to the department's success has been the completion of the Idaho Accelerator Center (IAC) on April 30, 1999. A substantial amount of lab space (4000 sq. ft.) within the department has become available due to a combination of the IAC and a remodeling of the physics building. A 400 sq. ft., class 10,000 clean room has been constructed at ISU to build the R1 drift chambers for Hall B's 12 GeV detector upgrade.

The PIs have created a Laboratory for Detector Science at Idaho State University which houses the groups infrastructure for detector development projects. The 1200 sq. ft. Laboratory is equipped with flow hoods, a darkroom, and a laminar flow hood used to provide a clean room environment sufficient to construct small prototype detectors. A CODA based data acquisition system with ADC, TDC, and scaler VME modules has been installed to record detector performance measurements. The PIs also established a student machine shop containing a mill, a lathe, drill press, table saw, and band which occupies its own space for the physics department to share. These facilities has a history of being used to construct detectors, measure detector prototype performance, and design electronic circuits.

The Idaho Accelerator Center (IAC) is located less than a mile away from campus and will provide a machining facility for detector construction, an electronics shop for installation of instrumentation, and beamtime for detector performance studies. The IAC houses ten operating accelerators as well as a machine and electronics shop with a permanent staff of 8 Ph.D.s and 6 engineers. Among its many accelerator systems, the Center houses a Linac capable of delivering 20 ns to 2 μ s electron pulses with an instantaneous current of 80 mA up to an energy of 25 MeV at pulse rates up to 1 kHz. The IAC has donated beam time to the Q_{weak} project for the purpose of testing detector performance. One of the goals of these tests will be to evaluate the Q_{weak} detector at high rates. The IAC is well suited for these rate tests as the Q_{weak} calibration rates will be much lower than the electron and photon rates the IAC is capable of generating. A full description of the facility is available at the web site (www.iac.isu.edu).

The Beowulf Resource for Monte-Carlo Simulations (BREMS) is a 60 node, 64 bit cluster housed in the ISU physics department which can support the high performance computing needs of the physics research program. This facility is the result of an investment made by NSF award PHYS-987453.