

1 HCAL-J OSP

Description

The Hall A Hadron Calorimeter, HCAL-J, will be mounted at the back of the SBS detector package and used to detect protons, neutron, pions, and kaons. It will be constructed from 288 individual detector modules assembled into an array 12 modules wide by 24 modules high (180 cm wide x 360 cm high). The total weight of the HCAL-J detector will be approximately 40 tons, but the modules will be mounted into 4 sub-assemblies so that the individual sub-assemblies can be positioned with a 20-ton capacity crane. A rendering of the assembled array is shown in Fig. 1.

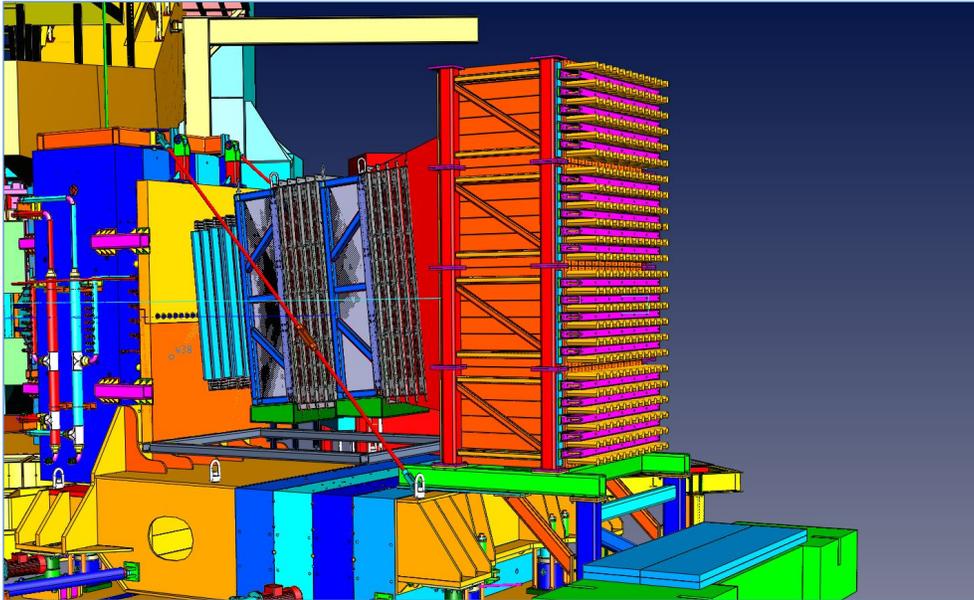


Figure 1: The HCAL-J hadron calorimeter array shown mounted at the back of the SPS detector package.

The individual modules are each constructed from two rows of alternating iron energy absorbers and scintillators and a single wavelength shifter that runs the length of the modules between the two rows. The wavelength shifter directs light to a 2 inch diameter PMT mounted on the back of the module. The completed HCAL-J array will have 288 modules, thus 288 PMT signals. The array will be be instrumented using existing XP2262H and XP2282/B

PMTs. Figure 2 shows a single module. The PMT housing, module can lid, and one row of iron absorbers/scintillators have been removed so that the wavelength shifter and the associated light guide is visible. A row of alternating iron absorbers/scintillators can be seen looking through the wavelength shifter.

HCAL-J will also include an LED/ fiber optic pulser system to facilitate signal checkout and stability monitoring.

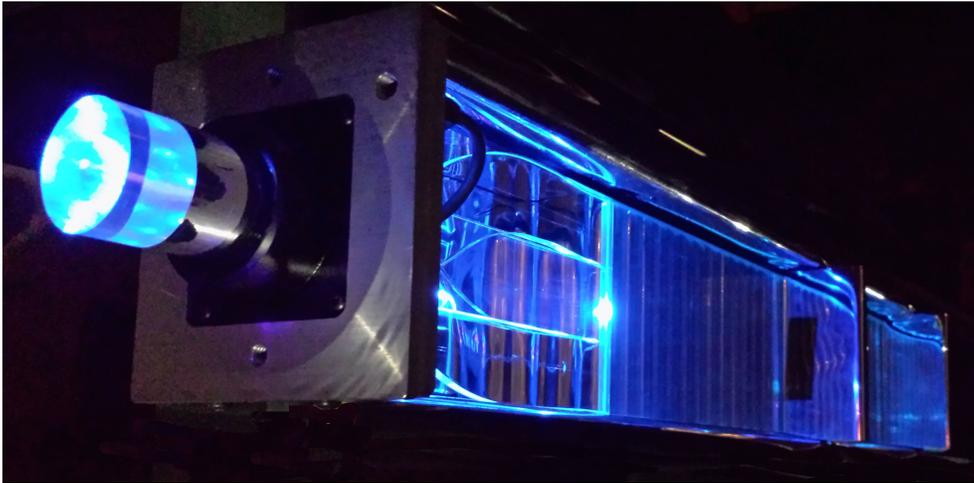


Figure 2: An HCAL modules opened with iron absorbers and scintillators removed from side.

Personnel Safety Issues

The high voltage to the 288 PMTs will be provided through standard HV cables and utilizes SHV connectors. They are rated at 5,000 volts and 4 amps. We will use power supplies whose maximum output is significantly below these ratings and plan to run at voltages below 2300 volts and less than 15 mA per channel. The plastic PMT housing prevents accidental contact with the HV distribution resistor chain.

The signals are less than 5 volts and will be output on BNC coax connectors. The SHV connectors are designed to prevent any accidental connections between SHV and BNC connectors.

The pulser system will use blue LEDs distributed via fiber optics. This avoids the safety issues associated with systems which use a UV-laser system

