

The ICD Project

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History of ICD: Run I vs Run II

- Shielding from magnetic field
 - PMTs cannot operate in kiloGauss plus
 - Position PMTs to region of reduced field
- Fiber tracker & SMT cabling
 - reduced eta coverage of ICD
- Reuse & Recycle
 - Hamamatsu PMTs ☑ 10-12 years beginning of Run II
 - Signal cables ☑ 26-line twist & flat
- Complete redesign of readout electronics
 - Compatibility with D0 BLS system
 - Conform to range of digitizing electronics (ADC)

Why do we need the ICD?

- Enhances the hermeticity and uniformity of the Calorimeter System
 - Rapidly changing material profile & extra “dead” material between the Central and Endcap Calorimeters
 - ICD provides additional sampling in the ICR
- Improves Missing ET calculation and Jet Energy Resolution measurement
 - Crucial role in coverage of $1.1 < |\eta| < 1.4$
 - Reduce rate of fake MET

What is the ICD?

- 16 modules mounted on Endcap Calorimeter faces
 - .5 in type Bicron BC400 - PVT-polyvinyltoluene
 - 12 Scintillating tiles/module - $i_{\eta} \times i_{\phi} = 1 \times 1$
 - $i_{\eta} = 12, 13, 14$ & $i_{\phi} = 1-64 \rightarrow 384$ total channels
 - Isolation grooves - white epoxy to optically isolate tiles
 - Fiber grooves - wavelength shifting fibers
 - transports signal to connection at outer radius of module
 - Tile module arrays enclosed in Aluminum box
 - rubber strip - flexible mounting to soldered pins on EC face
 - Symmetric in phi about beam pipe - aligned with FPS
 - gap for solenoid chimney - use half tile on ECS

What is the ICD?

- Clear fiber cables transport light signals from tiles to the fiber backplane & ICD crates
 - 5 meter length - diamond polished ends
- Four ICD Crates - NE, NW, SE & SW quadrants
 - fiber backplane, iron block, electronics drawers
 - readout for 96 ICD tiles
- Hamamatsu R647-01 photomultiplier tubes (Run I)
 - ICD requires 10 photoelectron yield at photocathode & average of 200K electrons from anode
 - Optimal high voltage of 750-800 Volts

What needs to be done?

- Not fully instrumented - Electronics drawers in DAB
 - Waiting for HV bases (2 weeks) - Finish North
 - Replace/fix bad channels - four known (out of 204)
- Systematic & regular calibration
 - Preamp and LED pulsers installed - fully functional
- Energy scale and weights
 - Isolated muons \uparrow Are there enough statistics?
 - Compare to test stand results (MIPs)
- High Voltage fan-out boxes
 - 1:3 fan-out (MCH116) - fully adjustable channels
- Timing - w/respect to Calorimeter readout