

AFTER, the Front-End ASIC of the T2K Time Projection Chambers

Thursday, 24 September 2009 16:55 (20 minutes)

The T2K (Tokai-to-Kamioka) experiment is a long baseline neutrino oscillation experiment in Japan, for which a near detector complex (ND280), used to characterize the beam, will be built 280m from the target in the off-axis direction of the neutrino beam produced using the 50 GeV proton synchrotron of J-PARC (Japan Proton Accelerator Research Complex). The central part of the ND280 is a detector including 3 large Time Projection Chambers based on Micromegas gas amplification technology with anodes pixelated into about 125,000 pads and requiring therefore compact and low power readout electronics. A 72-channel front-end Application Specific Integrated Circuit has been developed to read these TPCs. Each channel includes a low noise charge preamplifier, a pole zero compensation stage, a second order Sallen-Key low pass filter and a 511-cell Switched Capacitor Array. This electronics offers a large flexibility in sampling frequency (50 MHz max.), shaping time (16 values from 100 ns to 2 μ s), gain (4 ranges from 120 fC to 600 fC), while taking advantage of the low physics events rate of 0.3 Hz. 6000 AFTER ASICs, have been manufactured in 2008 using a low-cost 0.35 μ m CMOS technology. They are currently being integrated on the TPCs for a start of commissioning at the end of the year 2009 in Japan.

Primary author: Mr DELAGNES, Eric (CEA/Irfu)

Co-authors: Mr LE COGUE, Alain (CEA/Irfu); Dr CALVET, Denis (CEA/Irfu); Ms MONTMARTHE, Estelle (CEA/Irfu); Mr DRUILLOLE, Frederic (CEA/Irfu); Mr BARON, Pascal (CEA/Irfu); Dr DE LA BROISE, Xavier (CEA/Irfu)

Presenter: Mr DELAGNES, Eric (CEA/Irfu)

Session Classification: POSTERS SESSION

Track Classification: ASIC's