

# Fission Fragment Detector Test Summary Report

April-May 2009

Fission Fragment Detector (FFD) has been moved from Physics Storage, where it was stored for nearly two years, to the EEL Bldg. Room 126. The pressure insight FFD remained at about 10 Torr. We refilled new heptane gas up to 3 Torr and carried out preliminary test on FFD, checking signals from anode and cathode planes. The FFD was operated in a regular single step regime, for which we applied +370 V to anode plane, -100 V to cathode plane and guard plane was grounded. For feeding the anode and cathode preamplifiers +6 and -7.5 V were used. The vacuum chamber out gassing rate was about 12 mTorr/h and we did not observe any essential signal amplitude change during a one week continuous operation of FFD. The typical amplitudes of the anode signals lay in the interval between 100-200 mV, while amplitudes of cathode signals in the interval 200-300 mV, with exception that from the cathode X4L channel we did not observe any signal and signals from the Y4L channel were small, only ~50 mV.

At the next stage the FFD was opened. The previous target was replaced with the new one. In addition, the target was separated from top and bottom MWPCs by a grounded aluminized Mylar foil with 2  $\mu\text{m}$  thickness. The preamplifiers of the channels X4L and Y4L have been replaced. After these changes, the FFD was tested again in the same regular single step regime condition. The typical amplitudes of the signals from the top #4 and #3 modules (the two modules above the target and its charge separation Mylars) remain the same as before and lay in the range 100-200 mV for anodes, and 200-300 mV for cathodes. The typical amplitudes of the signals from the bottom #2 and #1 modules are slightly low than what we have had before and lay in the range 50-100 mV for anodes, and 100-200 mV for cathodes. This reduction is understood due to energy loss when fragments passed through the two additional charge separation Mylar foils above and below the target. The vacuum chamber out gassing rate was still about 12 mTorr/h. Thus, we conclude that the FFD resumed its normal operational condition with new target and all channels have normal signals as expected.

The following figures (pictures) show the signal examples from Anodes and Cathodes. Fig. 1 compares the anode signals between T4 (the top closest one to Cf252 fission source) and T1 (the most bottom one to which the fragments must pass through three 2  $\mu\text{m}$  Mylar foils). Fig. 2 to 4 show signals from three different Cathode planes and the two signals in each figure were from Left and Right such as Y4L and Y4R. The three cases show the time differences when fragments passed through at different locations.

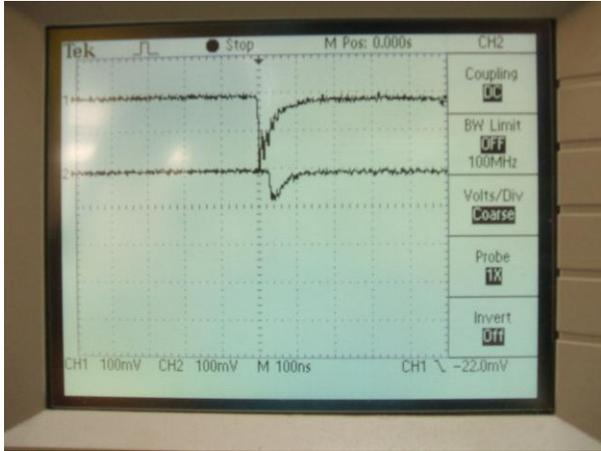


Figure 1. Signals from T4 and T1 (Anodes)

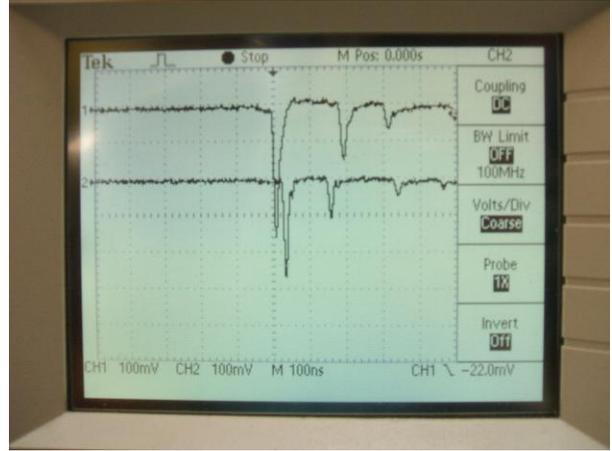


Figure 2. Signals from Y4L and Y4R (Cathodes). The fragment passed at ~2.3cm away from center.

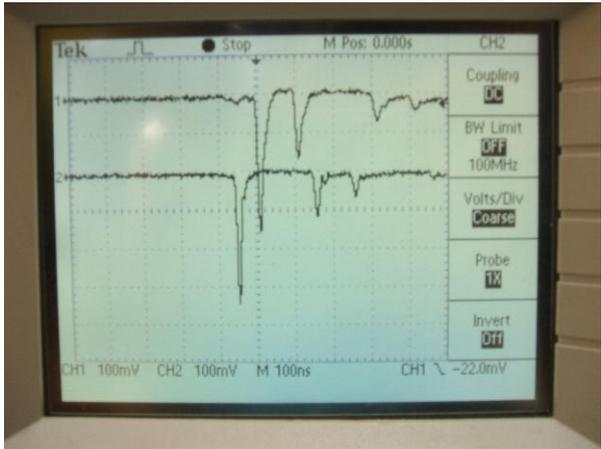


Figure 3. Signals from X4L and X4R (Cathodes). The fragment passed at ~5.5cm away from center.

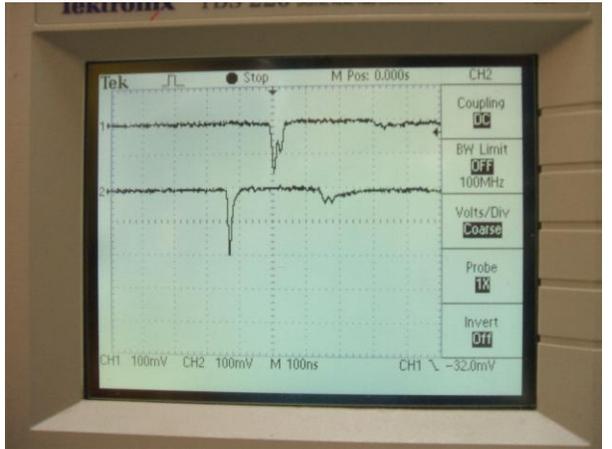


Figure 4. Signals from X1L and X1R (Cathodes). The fragment passed at almost the edge of the plane (~12 cm from center).