Multi-Wire Proportional Chamber and Gas Electron Multiplier

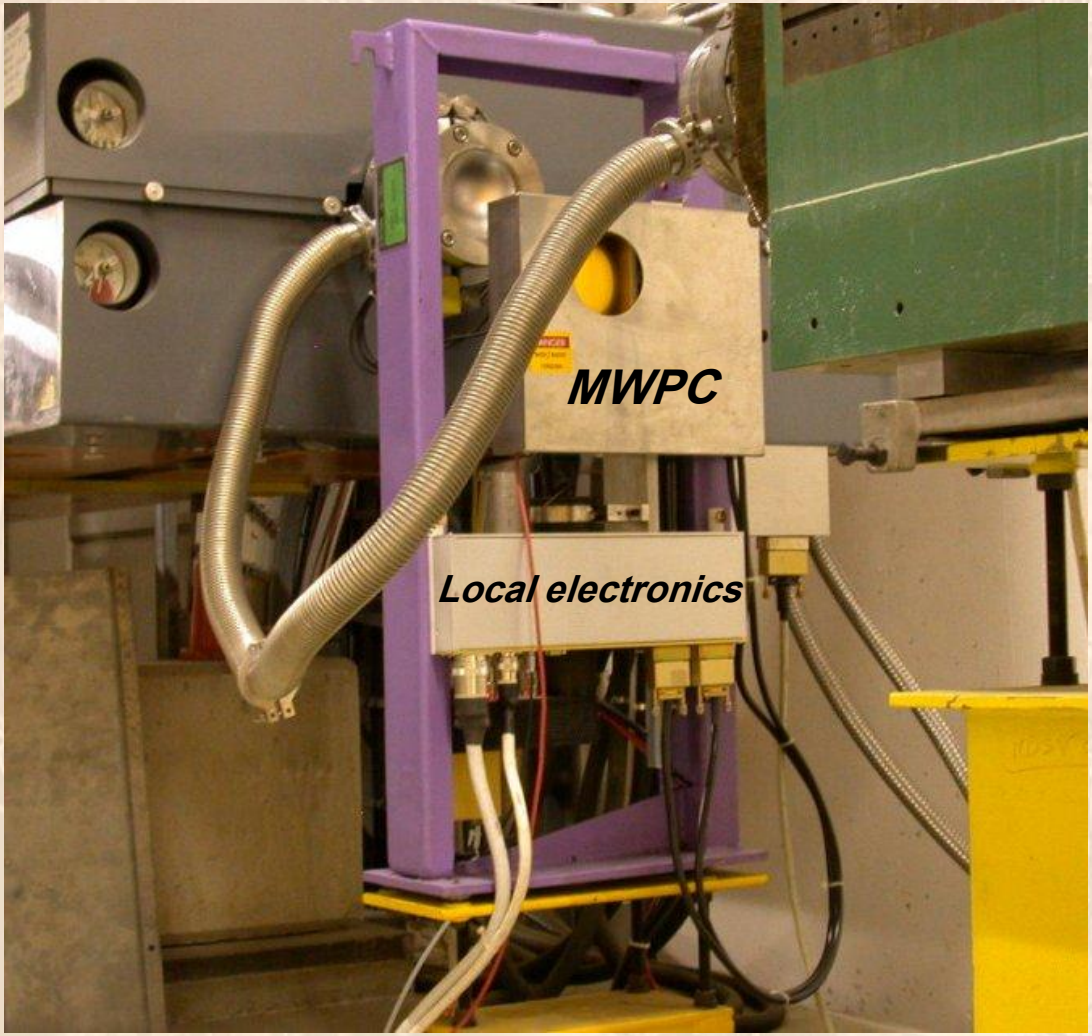
Local electronics in TT83

Radiation issues

Presentation

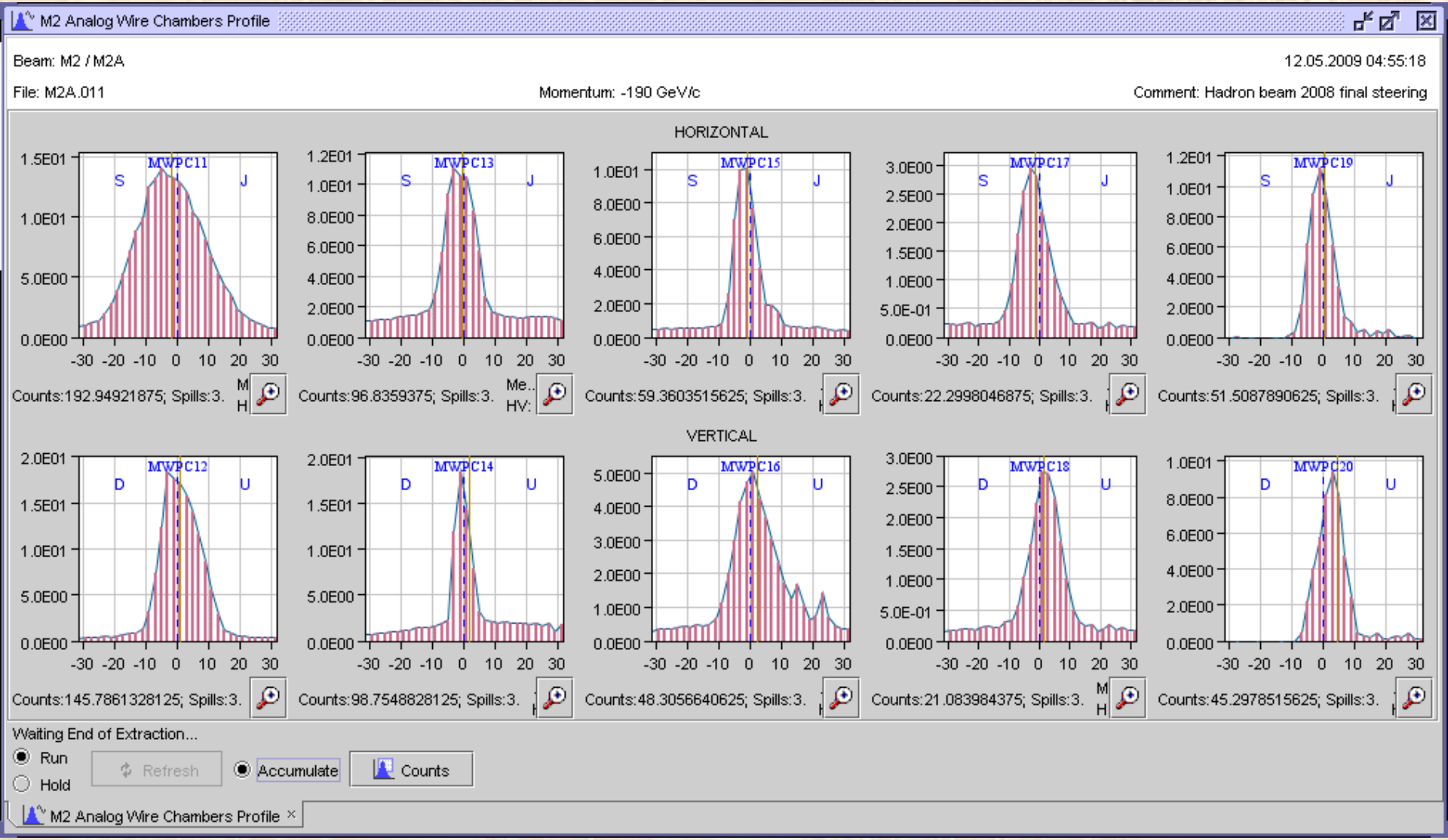
1. Introduction.
2. MWPC in TT83.
3. Gas Electron Multiplier (GEM).
4. Local Electronics on the beam line.
5. The North Area.
6. Radiation level in TT83.
7. New local electronics.
8. Test results at the H4IRRAD facility.

Multi-wire Proportional Chamber



- MWPC are widely used in the experimental areas for profile measurement.
- The yellow gas window of the chamber can be seen inside a shielding box, here presented in the out-position.
- The local electronics is located on the purple support 60 centimeter below the beam.

Multi-wire Proportional Chamber



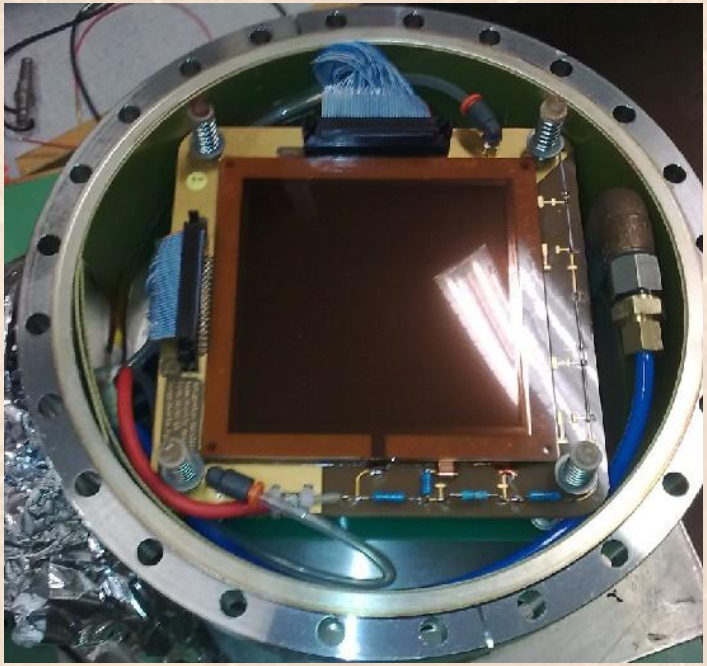
M2 MWPC in TT83

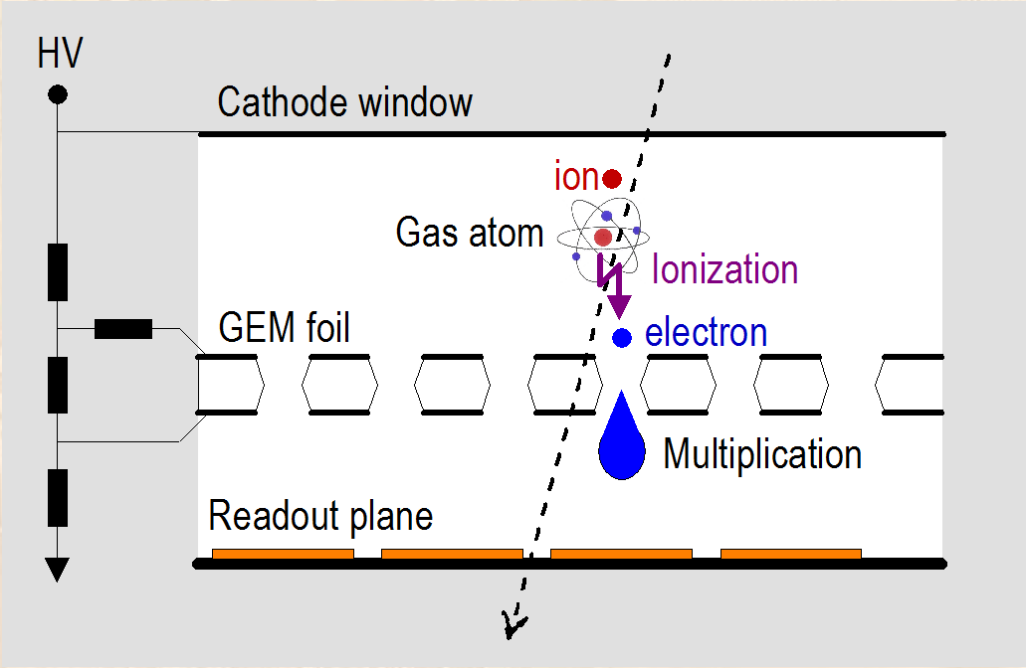
Distance from target [m]

1. XWCM.061.102 : Radiation damage yearly !!!
2. XWCM.061.219 : Radiation issues !
3. XWCM.061.543 : OK !
4. XWCM.061.649 : OK !
5. XWCM.061.703 : OK !
6. XWCM.065.009 : OK !
7. XWCM.065.057 : OK !
8. XWCM.065.079 : OK !
9. XWCM.065.102 : OK !
10. XWCM.065.123 : OK !

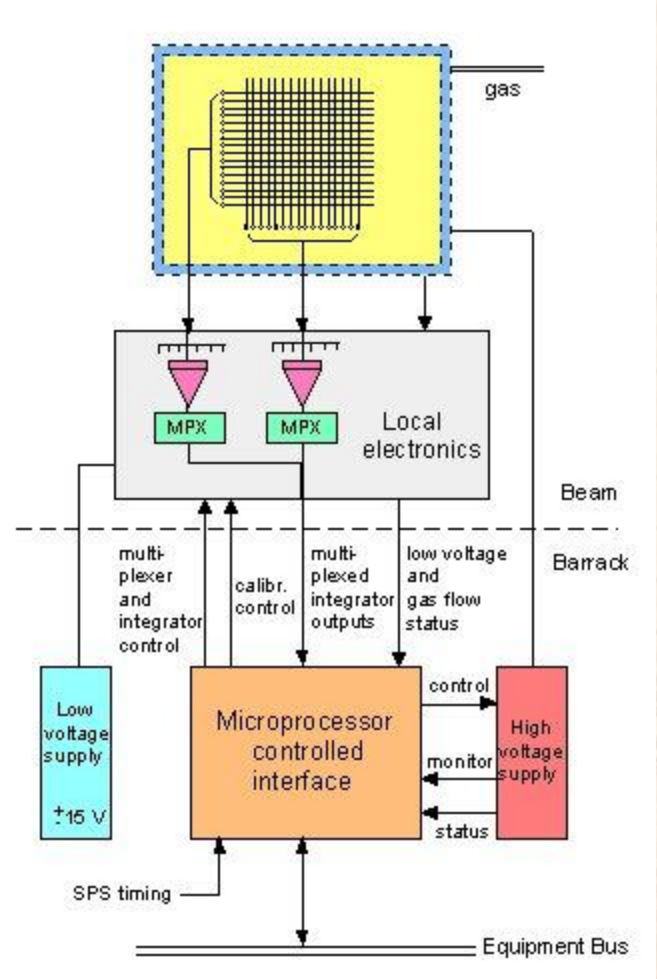
Gas Electron Multiplier

1. Gas Electron Multiplier (GEM) are using the same local electronics as Multi-wire Proportional Chambers. New GEM detectors are scheduled to replace MWPC on the M2 beam line.



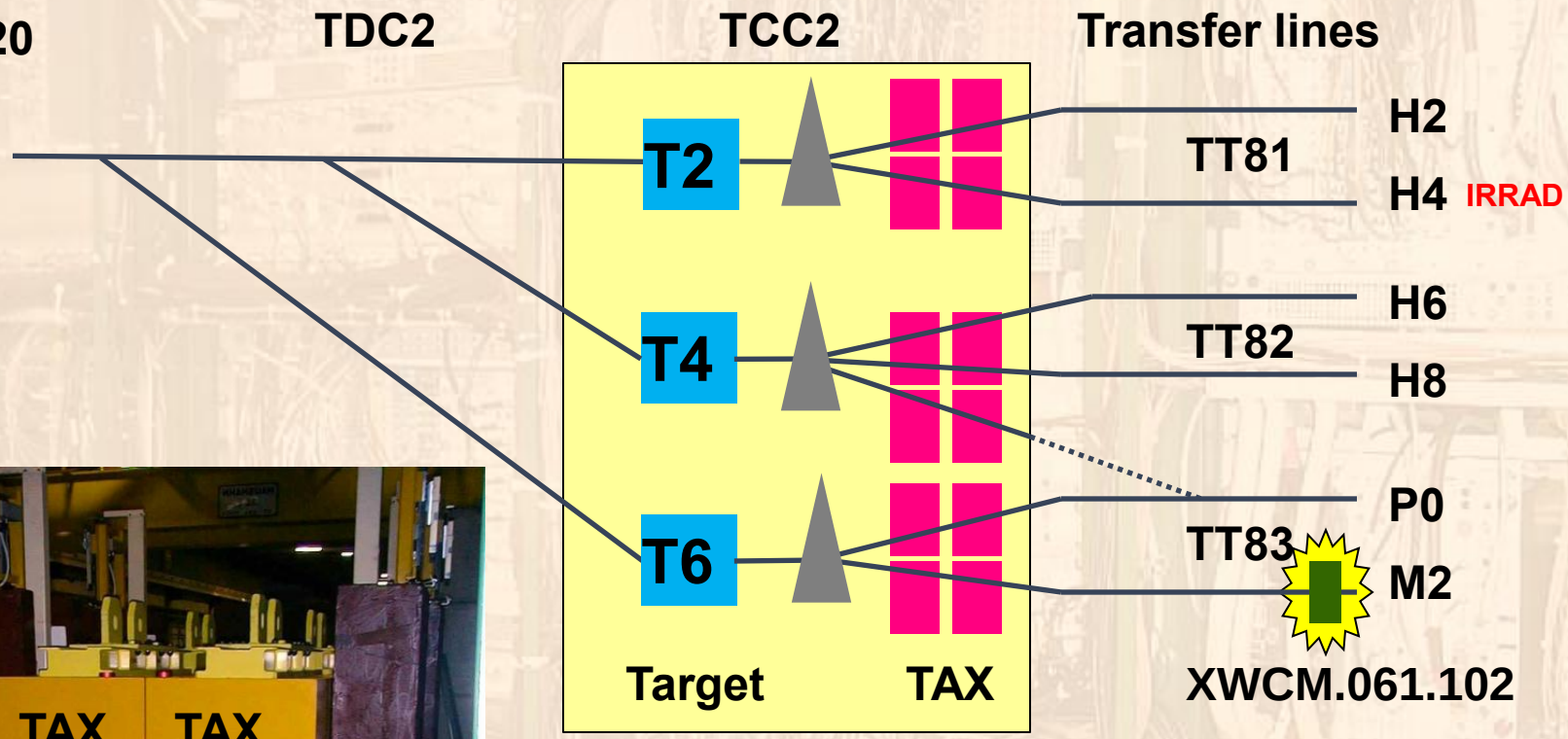


MWPC Local Electronics

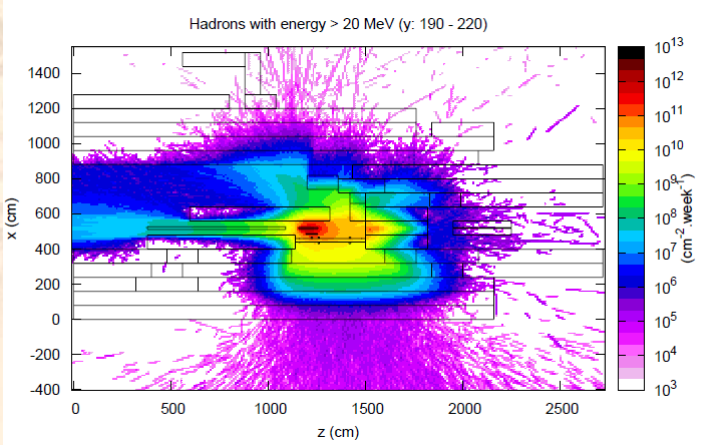


- The local electronics contains integrators for each wire of the chamber and the integrated charge is multiplexed and send to the acquisition system on the surface, often through several hundred meters of cable.

The North Area



Irradiation of XWCM local electronics

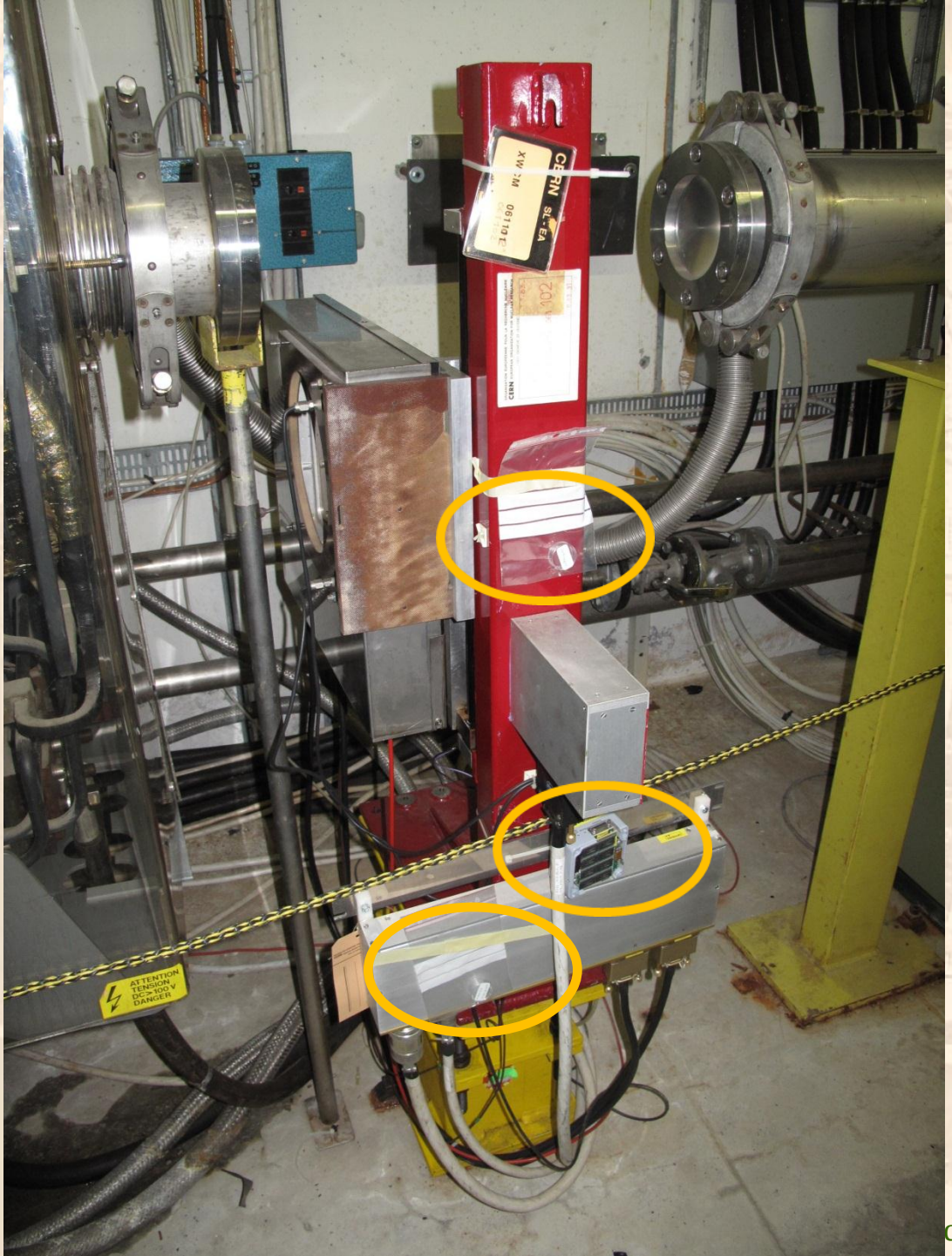


- Since many years, we are suffering radiation damage of the old local electronics for the XWCM located upstream in TT83. Many different types of shielding have been tried out with poor success as a large fraction of the radiation comes directly from the target area in TCC2.

- A newly developed Rad-Hard local electronics have been put under test inside the H4-IRRAD since May.
- All tests are done parasitically.

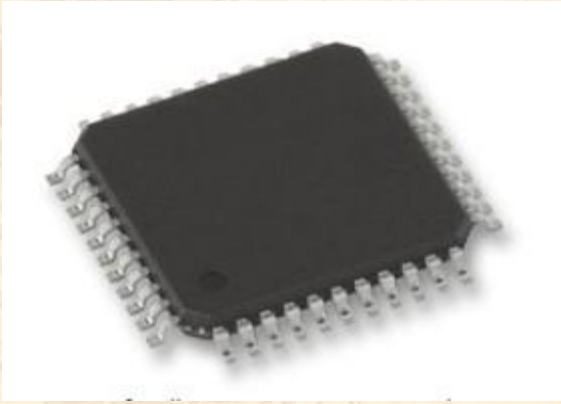
Radiation level in TT83

- Radiation monitors were installed in TT83 on several locations around XWCM.061.102 and XWCM.061.219 for the Start-Up.
- These monitors has revealed an average radiation level of …?
- At XWCM.061.102:
- At XWCM.061.219:


ATTENTION
TENSION
DC>100 V
DANGER

New local electronics

- Trible logic with an XILINX :
- XC2C384 CoolRunner-II CPLD



Test results at H4-IRRAD

- Radiation dose…?
- No real radiation damage observed.
- But several Single Event Upset observed, needing a reset of the XILINX.

Thank you for your attention !