

Measurements and irradiation at CERN

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INFN-FBK Meeting
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Outline

- **Lab-test measurements of proton irradiated assemblies**

- 2E-, 3E-, 4E-teype (1st batch)
- Irradiated with 25MeV proton in Karlsruhe (by Bonn) up to 5.4 E14 p/cm^2 (**1 E15 n_{eq}**)
- Leakage current at different temperatures
- Noise vs bias voltage at different temperatures
- γ -source test measurement (self-trigger) at different bias voltages
- β -source test measurement (triggered externally by scintillator) at different bias voltages

Preliminary results (by CERN group) are available at:

<https://twiki.cern.ch/twiki/pub/Main/CernAtlasPixelSensorsRD/3D-100629.pdf>

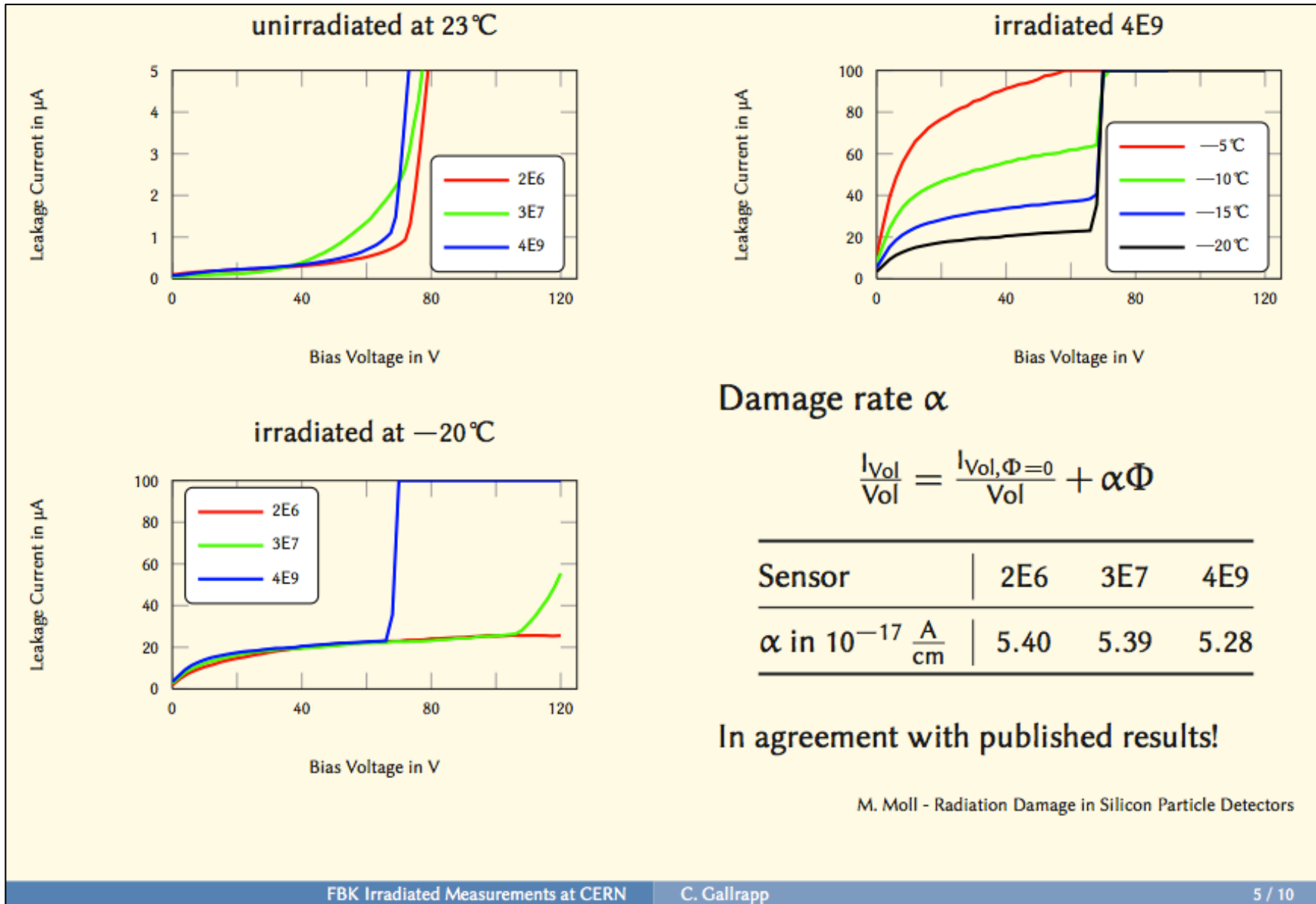
https://twiki.cern.ch/twiki/pub/Main/CernAtlasPixelSensorsRD/FBK_irradiated_Measurements_CERN.pdf

Results in agreement with Bonn:

<http://indico.cern.ch/getFile.py/access?contribId=15&resId=0&materialId=slides&confId=97122> (pwd: 3Ddream)

- SCAs sent back to Bonn for second irradiation step ($2 \text{ E15 } n_{eq}$)
- Looking forward to test neutron irradiated assemblies
- PS Irradiation of 3D/FBK diodes concluded - devices ready for the shipment
- Have in planning to irradiate 2E and 4E with 24GeV proton beam (CERN PS) in October
- Announcement:
 - ATLAS 3D Rad Hard WG on Sept. 14th at 5pm CEST
 - Next ATLAS 3D testbeam: Oct. 11-21

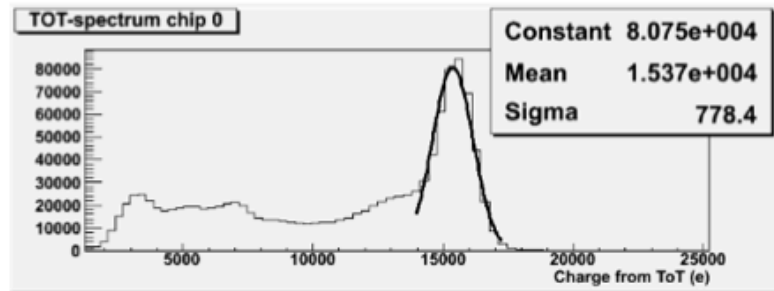
Leakage current overview



Source-tests overview (241Am)

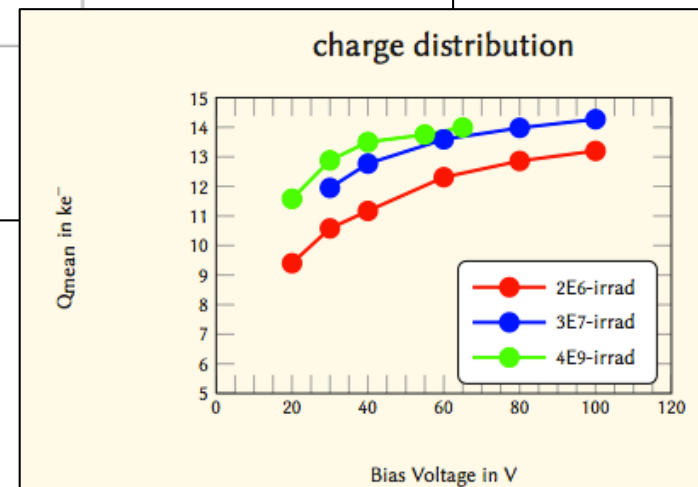
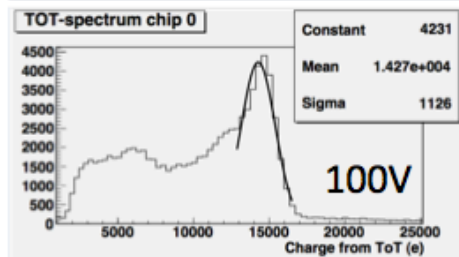
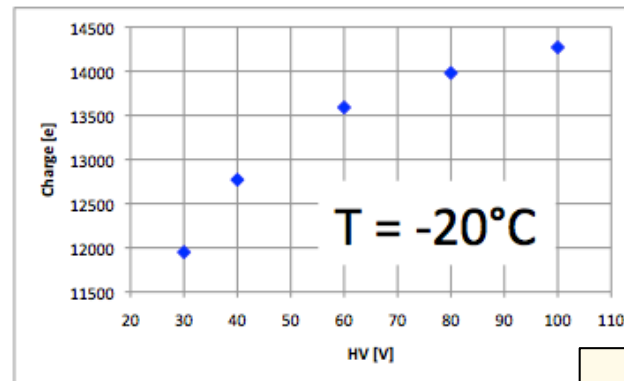
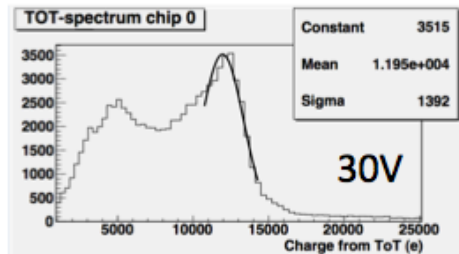
- Before irradiation (T=22°C and HV=35V)

3E-TYPE



Shows the source spectrum as a sum over all pixels without any clustering.

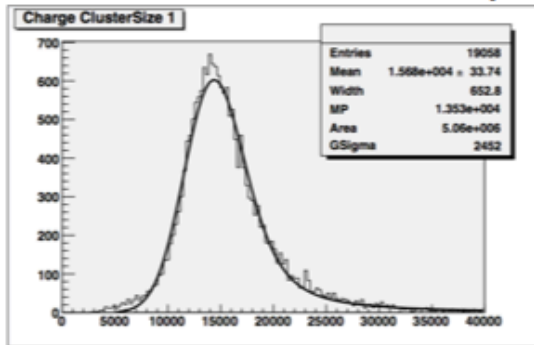
- Measurements at different bias after irradiation (1 E15n_{eq})



ATLAS 3D - Testbeam Meeting, 30.6.2010 - Alessandro La Rosa (CERN)

Source-tests overview (Sr90)

- Before irradiation (T=22°C and HV=35V)

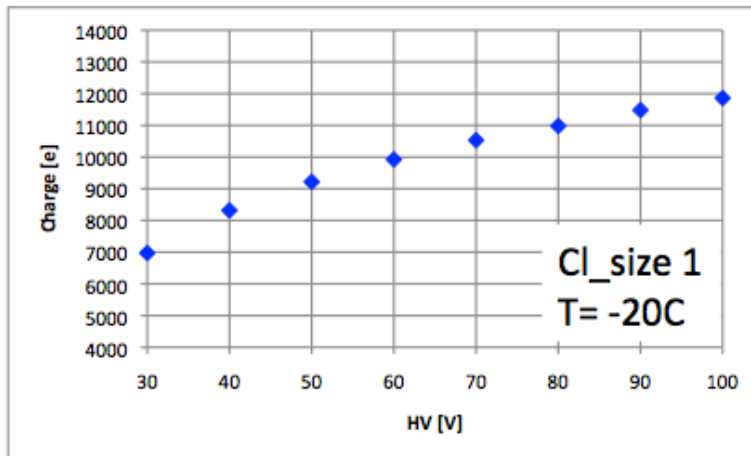


Cl_size 1: MPV = 13.53 ke-

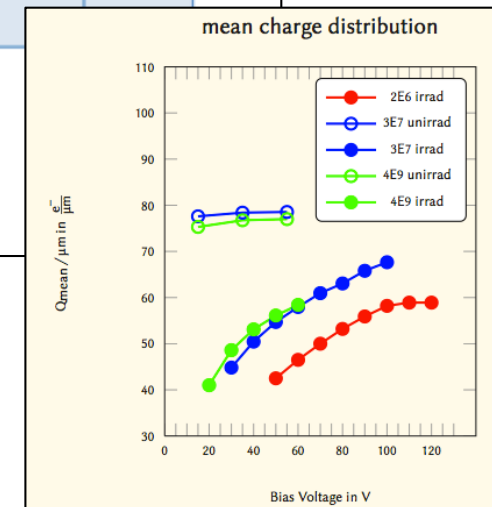
Expected value if we compare it with what has been obtained from Planar pixel sensor (250um thick): 16.02 ke- (Cl_size 1)

3E-TYPE

- Measurements at different bias after irradiation (1 E15n_{eq})



HV	30V	40V	60V	80V	100V
Lost charge	49%	40%	30%	21%	15%



ATLAS 3D - Processing Meeting. 7.7.2010 - Alessandro La Rosa (CERN)

INFN-FBK Meeting. 23.8.2010 - Alessandro La Rosa (CERN)