HELSINKI INSTITUTE OF PHYSICS

n- and p-type Cz-Si detectors irradiated with high and low energy protons

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Outline

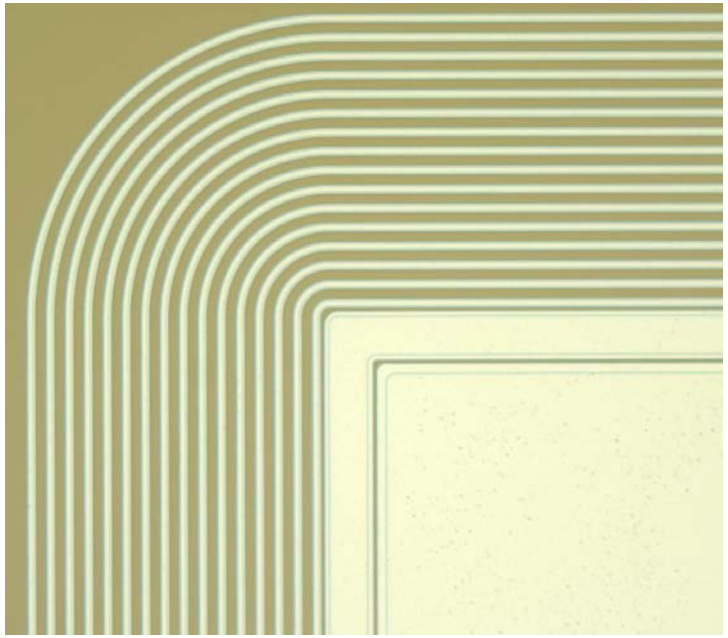
- Materials
- Irradiations
- Evolution of depletion voltage in:
  Fz n-Cz p-Cz
- Summary of beta parameters
- Conclusions

Materials

Thickness of all samples is 300μm

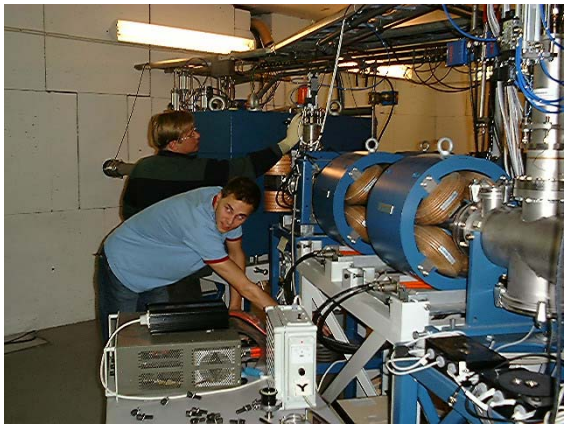
* Magnetic Cz-Si, 1000 Ωcm, Okmetic, n-type
* Magnetic Cz-Si, 1800 Ωcm, Okmetic, p-type
* Standard Fz-Si, 1200 Ωcm, Wacker, n-type

Processing done at HUT Micronova cleanroom

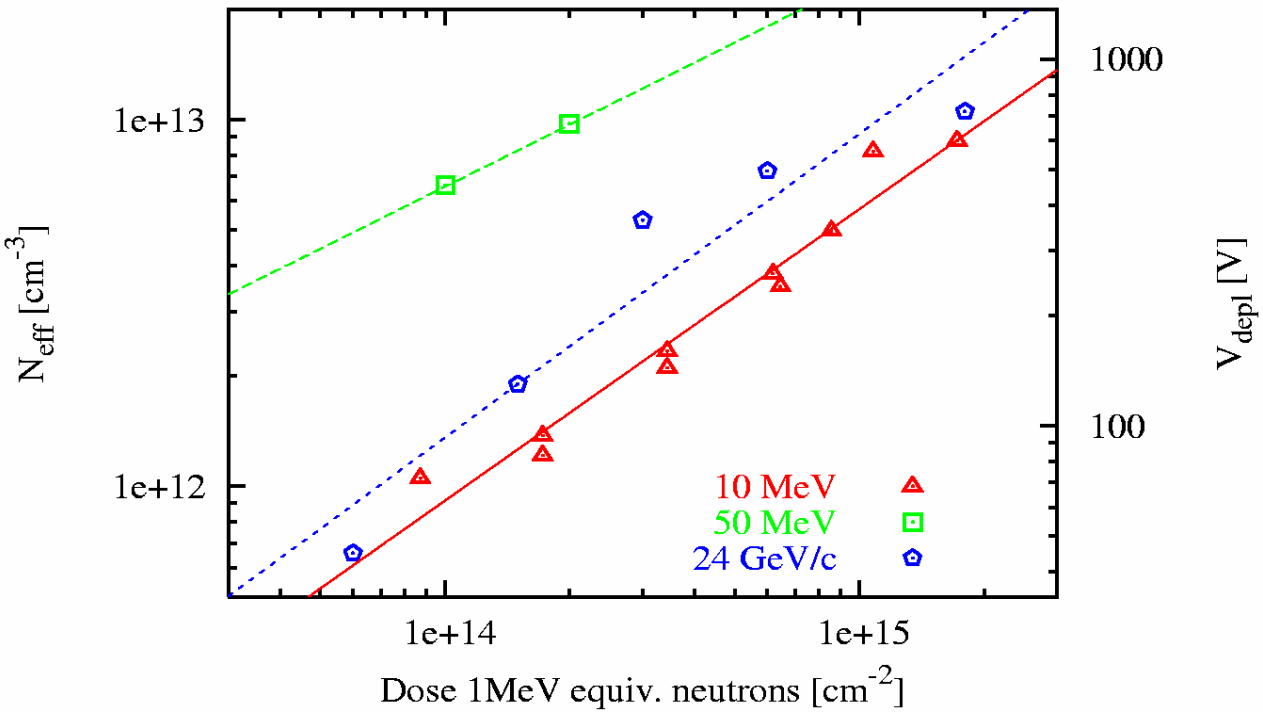


Irradiations

- 10 and 50 MeV Protons at University of Jyväskylä Accelerator Laboratory, Finland.
- 24 GeV/c Protons (with PS) at CERN, Switzerland.



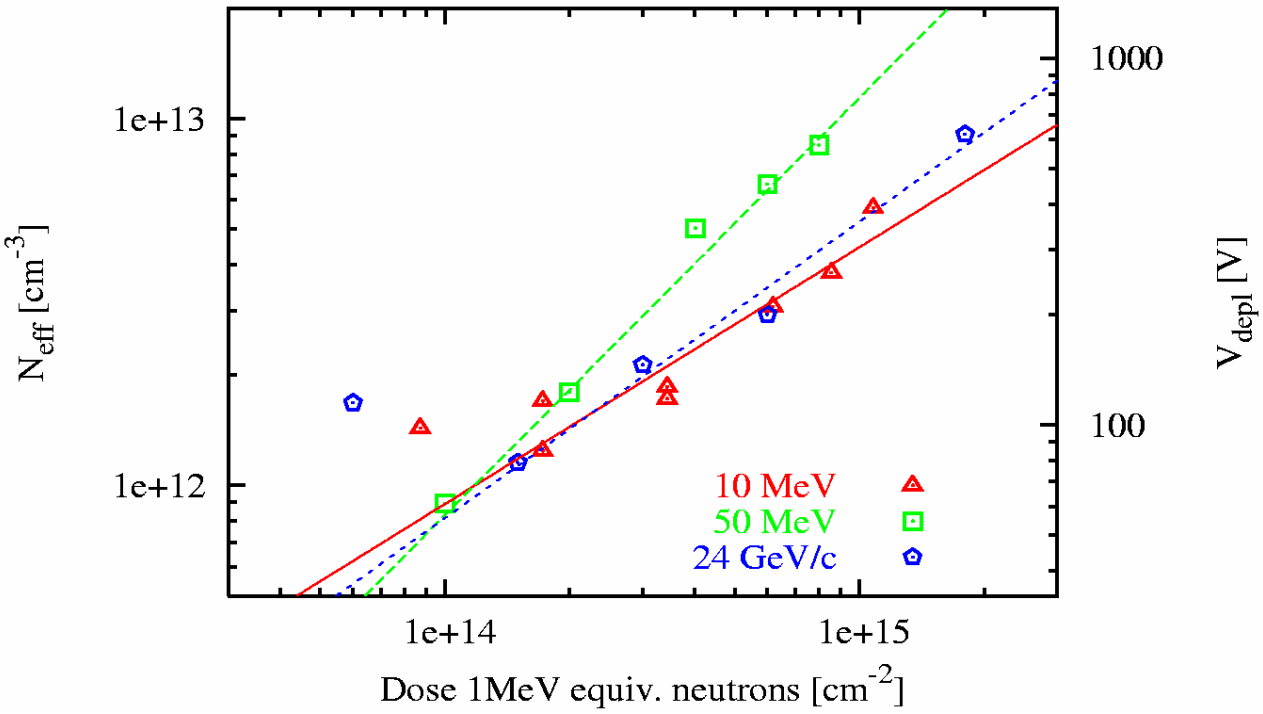
Characterization (Fz)



β-values

10 MeV	5.14E-3
50 MeV	1.79E-2
24 GeV/c	8.40E-3

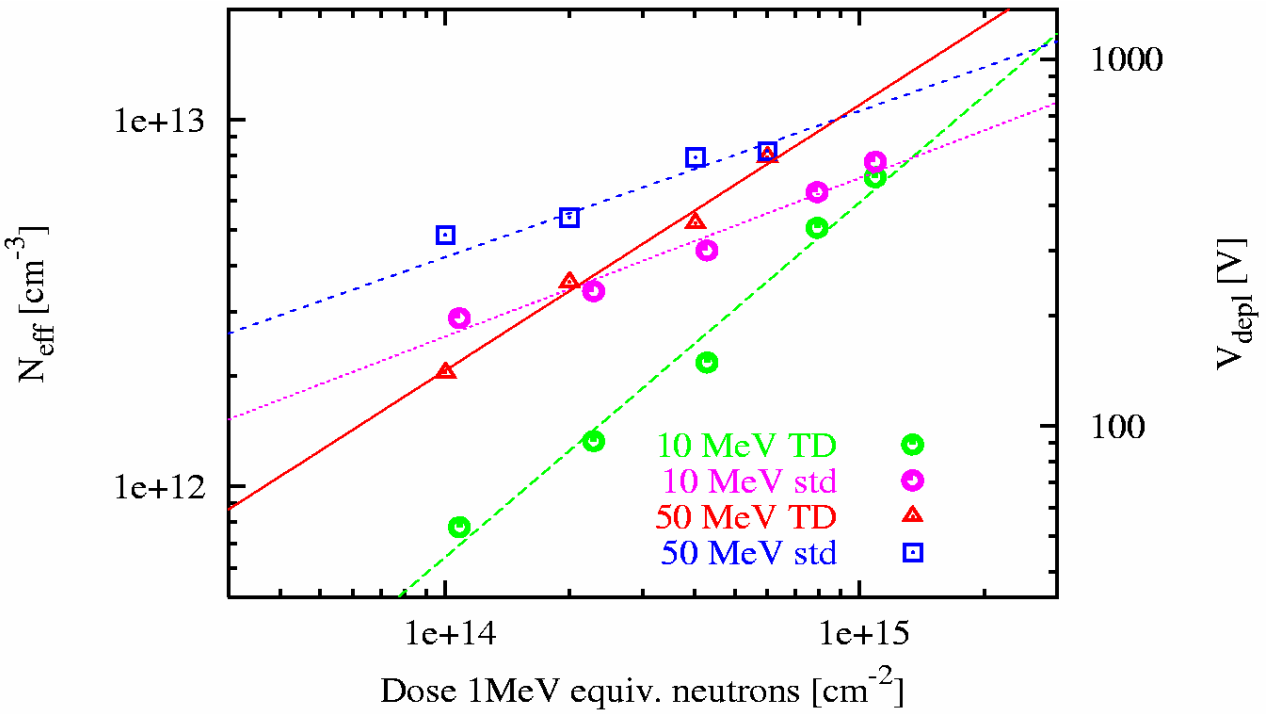
Characterization (n-Cz)



β-values

10 MeV	3.77E-3
50 MeV	1.24E-2
24 GeV/c	4.76E-3

Characterization (p-Cz)



β-values

10 MeV TD	5.85E-3
10 MeV std	3.80E-3
50 MeV TD	9.44E-3
50 MeV std	6.24E-3

Summary of the β-parameters

	Fz	n-Cz
10 MeV	5.14E-3	3.77E-3
50 MeV	1.79E-2	1.24E-2
24 GeV/c	8.40E-3	4.76E-3

	p-Cz
10 MeV TD	5.85E-3
10 MeV std	3.80E-3
50 MeV TD	9.44E-3
50 MeV std	6.24E-3

Conclusions

- Czochralski silicon was found to be more radiation hard than Float-Zone silicon
- Furthermore, p-type Cz-silicon was found to be more radiation hard than n-type Cz-silicon.