This project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie-Sklodowska-Curie grant agreement number 721624.
Emerging Radiation Effects: Singly charged particles and innovative materials

ESR 04 - Vanessa Wywoll
RADSAGA Training Workshop – March 2018
Introduction

- Investigation of impact on failure rate of state-of-the-art microelectronic components
- Increasingly sensitivity to minor charged particles
- Explain the mechanisms behind these novel effects
Dose deposition related to cylindrical radius

XY plane scoring radius 10 microns and thickness 10 microns

XY plane comparison Xe 10 MeV/n and Xe 40 GeV/n
North Area H8 2017
SREM

Results

- Comparison to simulations performed using radiation analysis tools (GRAS & FLUKA)
- Calculate response from counts rates caused by flux Xe ion beam in H8 (Beam not only Xe ions, but also other particles in the beam itself, secondaries from vacuum lids, ...)

[A. Waets (ESA)]
PIN diode

![Graph showing PIN diode data](image-url)
PIN diode
PIN diode

Data PIN diode Canberra FD50-14-300RM Xe 40 GeV/n
ISIS ChipIr 2018
ISIS ChipIr 2018

Proton Beam (800MeV)

Be reflector

Tungsten target

ChipIR hole

Secondary Scatterer

Fast Neutron Beam

Atmospheric Fast Neutron Beam

Target Station 2

Sans2d

Zoom

Polref

Inter

Offspec

Larmor

Wish

Nimrod

Let

IMAT
PIN diode

PIN diode Canberra FD50-14-300RM ISIS neutron spectra 0-800 MeV/n

Voltage in mV

1000 2000 3000 4000 5000 6000

sample number

142 143 144 145 146 147 148 149 150 151 152

time output
PIN diode

PIN diode Canberra FD50-14-300RM ISIS neutron spectra 0-800 MeV/n

Voltage in mV

energy output

sample number
Outlook

- Collaboration ESR 5 + ESR 9: SRAM detector development
- Calibration of PIN diode in neutron Am-Be source and gamma source Cs-137 at CERN
- Measurements GANIL Pb 29 MeV/A with PIN diode setup
- Experiment NA H8 using Pb 159 GeV/n in Nov 2018: SREM + diode
Back Up Slides
PIN diode

PIN diode Canberra FD50-14-300RM ISIS neutron spectra 0-800 MeV/n

Voltage in mV

sample number

2000 4000 6000 8000 10000

142 143 144 145 146 147 148 149 150 151 152 153 154

time output
PIN diode

PIN diode Canberra FD50-14-300RM ISIS neutron spectra 0-800 MeV/n

Voltage in mV

sample number

energy output