



# Varadis

# An improved RADFET-based module with an extended dose range of 1kGy TID based on COTS parts

Providing Radiation Measurement Technology to Astronauts, Government organisations healthcare and Global Scientific Institutes for over a decade!

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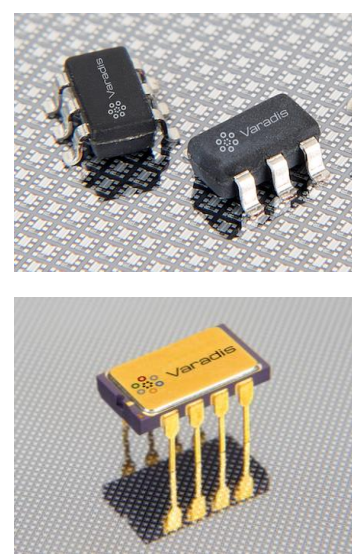
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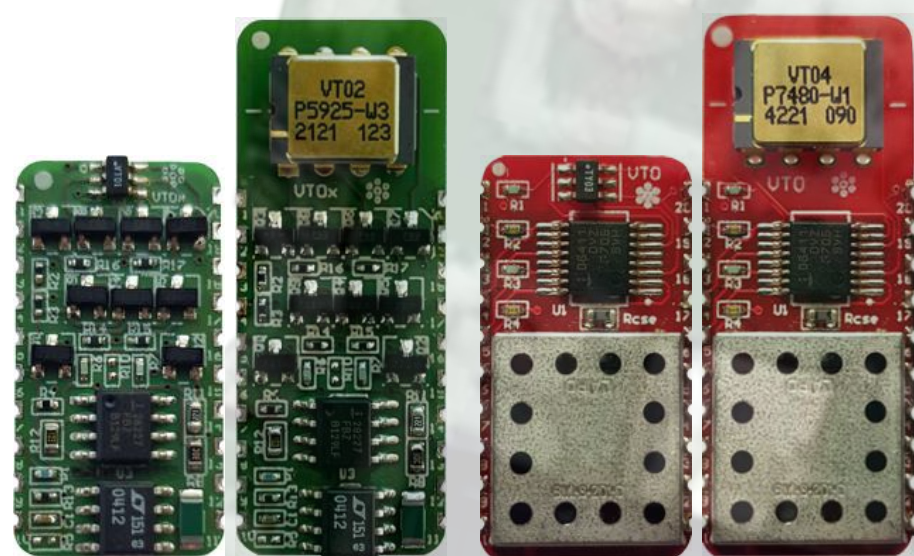
Contact us:  
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## ABOUT VARADIS

Varadis is a spin-out company from Tyndall National Institute in Cork, Ireland; a leading European research centre. Varadis is leveraging over 30 years of Tyndall technology development in the radiation monitoring space. As a result, we are now building and selling the worlds' most effective and dynamic radiation monitoring components, devices and systems to some of the globes most recognised organisations. Some products from our portfolio:



RADFETs



Modules



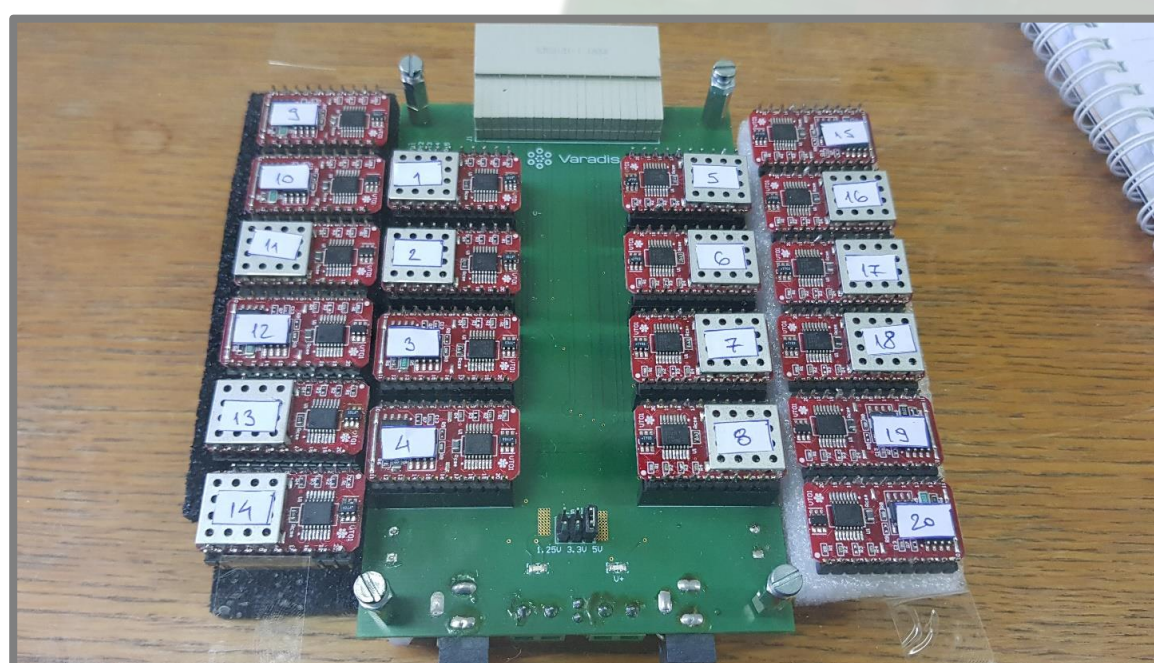
RADFET  
Reader

## MOTIVATION

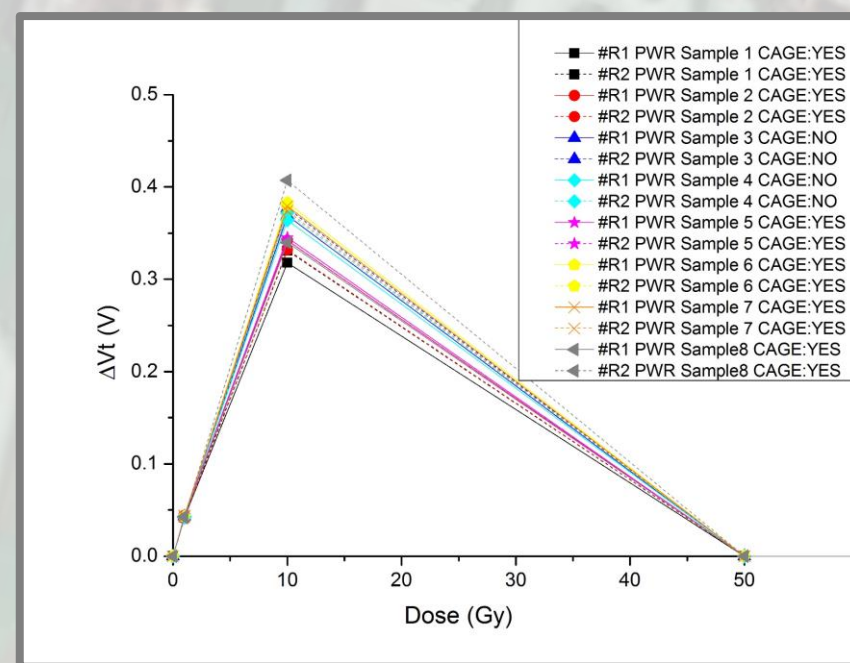
- Design and implementation of RADFET based dosimeter for TID range from 0 to 1kGy (100 kRad), serial number: RM-VT01-A
- Based on commercial-off-the-shelf parts
- Extend the dose range of RM-VT01 from 10Gy to 1kGy
- Improve readout circuit to address the challenge of withstanding 1kGy (100 kRad) received dose
- Accommodate both irradiation "sense" and readout "single-current-point" mode, outputting buffered RADFET threshold voltage (VT) as a dosimetry information
- Module output voltage to be measured with a simple voltmeter, to demonstrate module operation simplicity and easy system integrability.
- NASA have shown there is an issue with their circuitry where doses exceeding 350Gy (35kRad) [1]

[1] M. Alvarez et al., "On-Orbit measurements of TID and Dose Rate from two RADFETs on board NANOSAT-1B satellite," 2016 IEEE Radiation Effects Data Workshop (REDW), 2016, pp. 1-4, doi: 10.1109/NSREC.2016.7891725

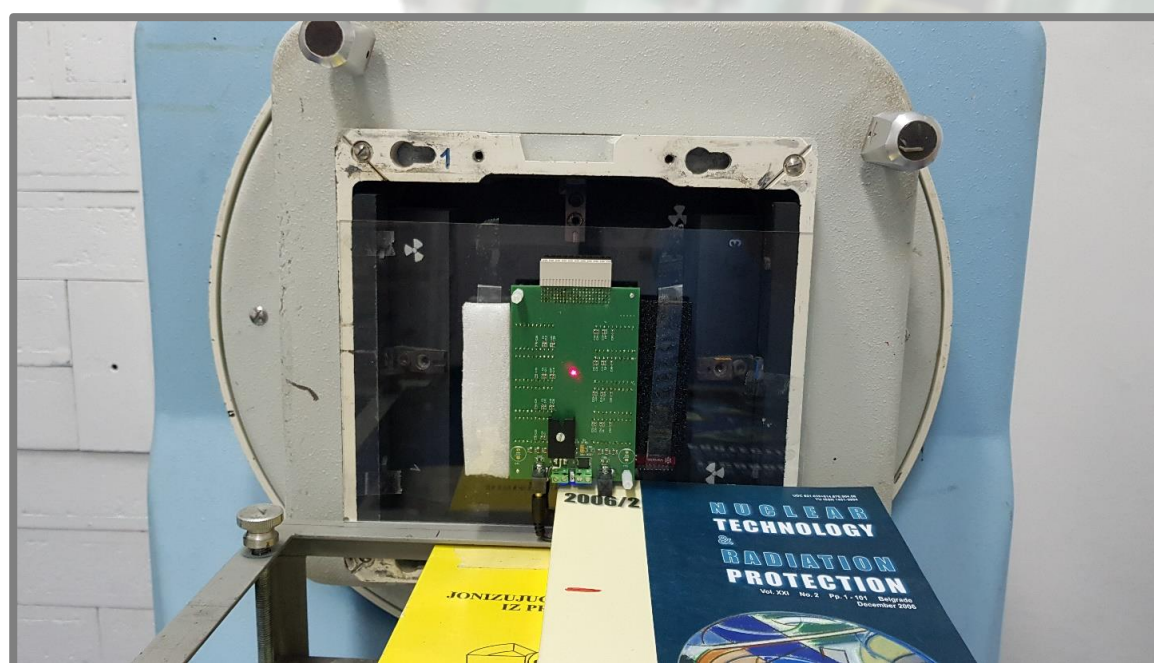
## RM-VT01 RESULTS



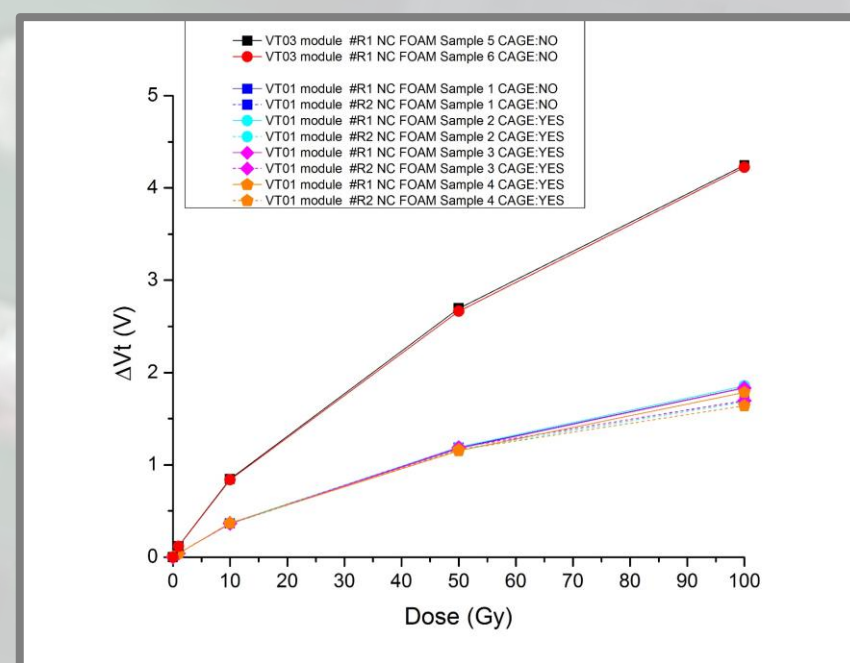
RM-VT01 and RM-VT03 modules, 8 powered and 12 unpowered, on conductive and insulating foam



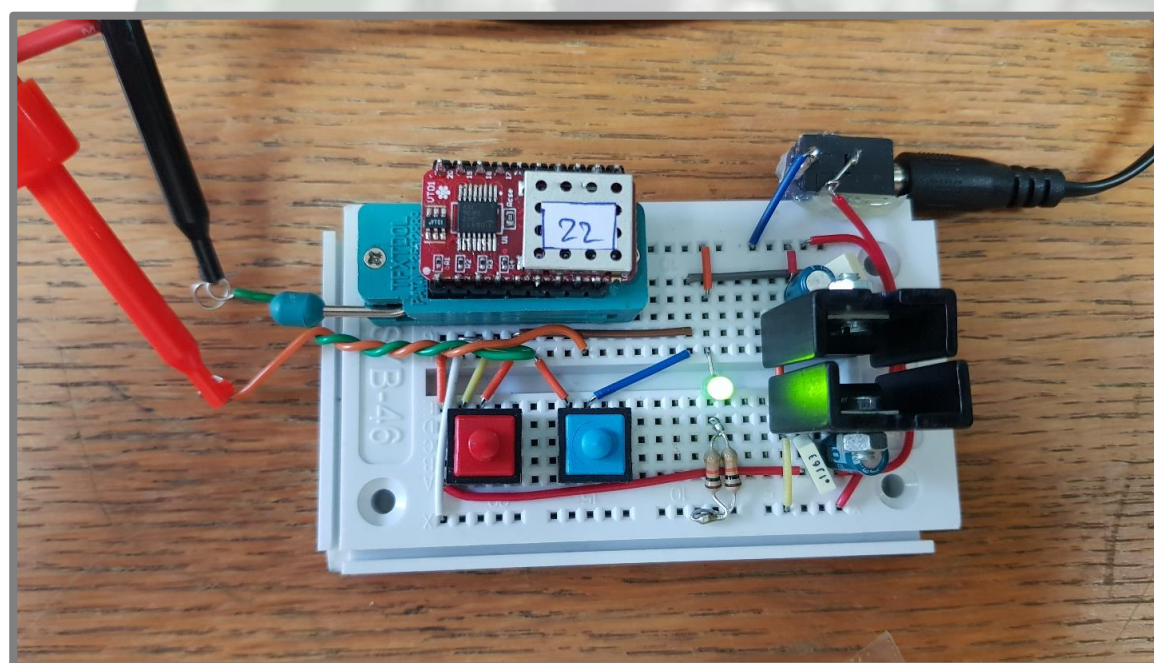
Radiation response of the powered samples RM-VT01 and RM-VT03



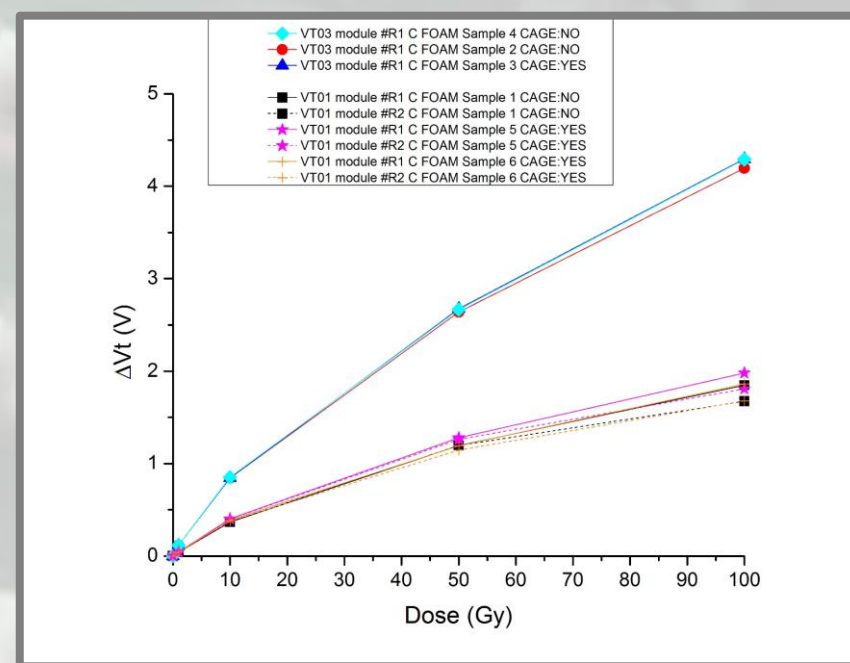
Co-60 source, Gamma photons, DR = 24.6 Gy/h, Vinča Institute of Nuclear Sciences, 10 August 2021



Radiation response of the powered samples RM-VT01 and RM-VT03

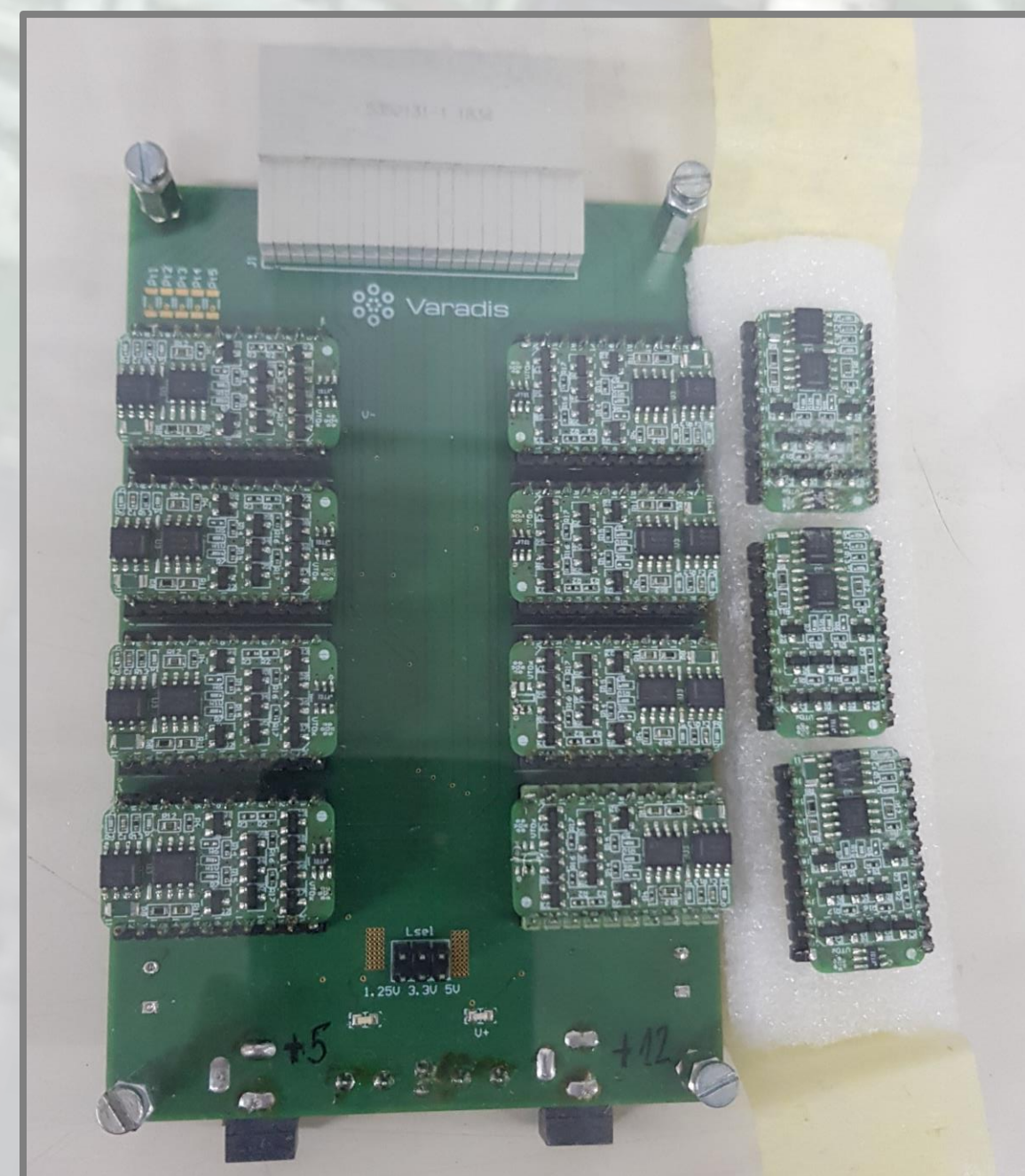


Breadboard simplistic readout, providing power to the module and control signals

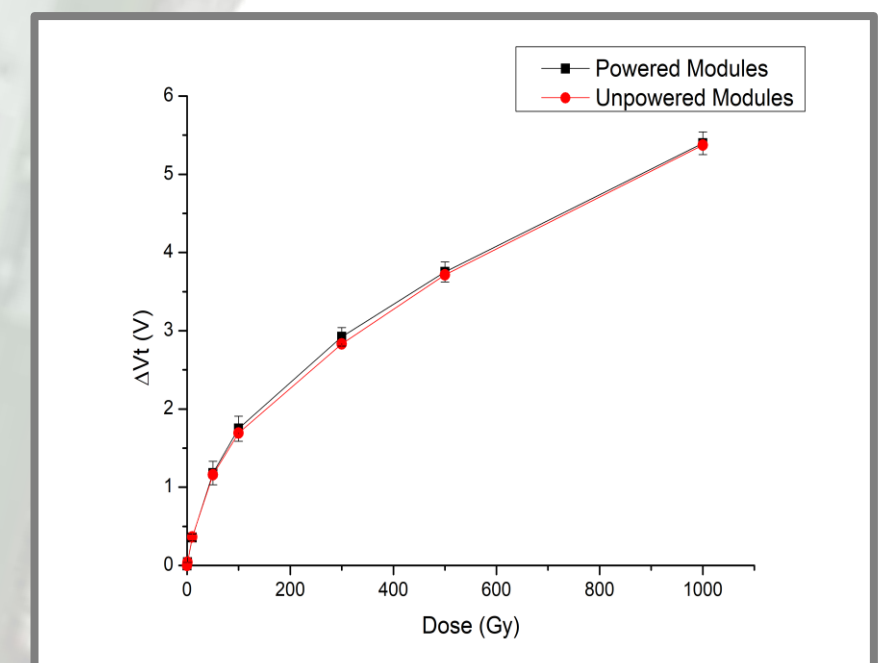


Radiation response of the powered samples RM-VT01 and RM-VT03

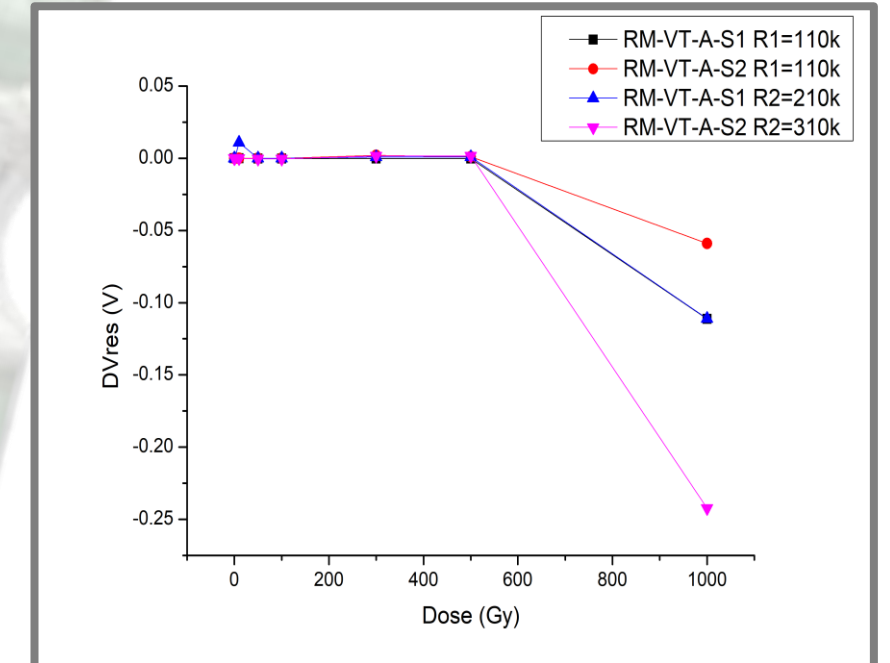
## RM-VT01-A RESULTS



RM-VT01-A modules, 8 powered and 3 unpowered, on insulating foam, 2 modules with resistors



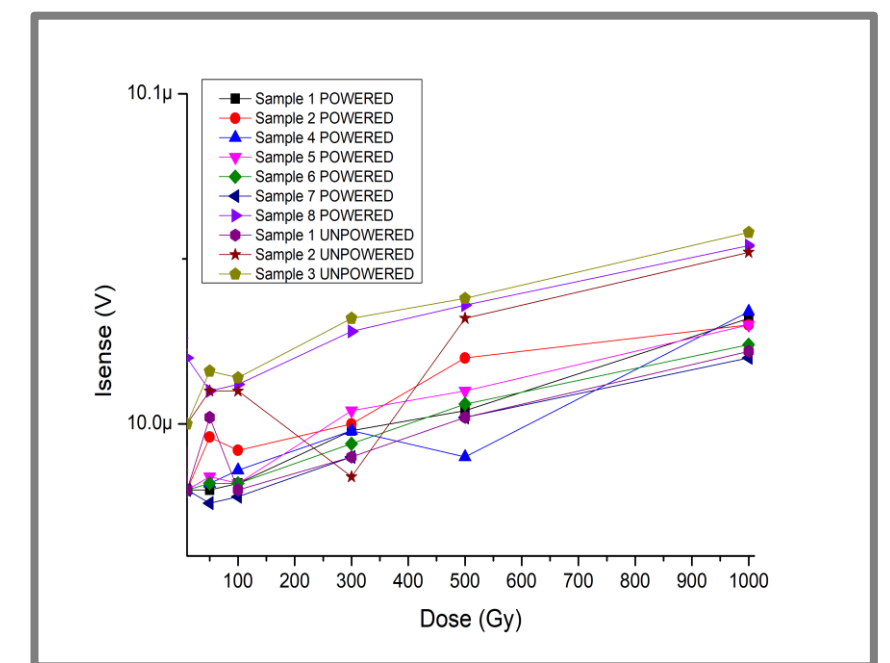
Radiation response of the samples RM-VT01-A



Radiation response of the powered samples with resistors



Co-60 source, Gamma photons, DR = 23.2 Gy/h, Vinča Institute of Nuclear Sciences, 21 January 2022



Current source value measured on RM-VT01-A shunt resistor