Work Package 2

PTB Highlights

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Overview

Secondary standards and reference methods for reference and relative dosimetry

- Testing of secondary standards for absorbed dose in electron beams with ultra-high dose per pulse

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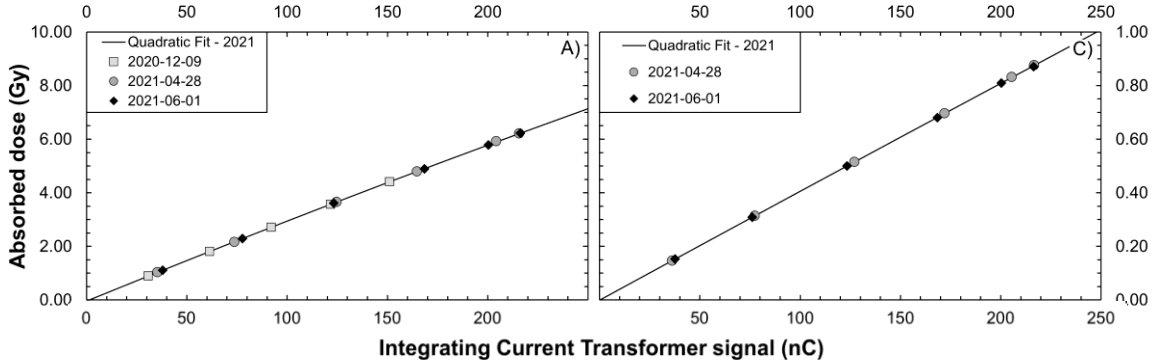
  - Test of solid-state detectors as secondary standard
  - Characterisation of ionisation chambers as secondary dosimetry standards

Characterisation of Alanine/ESR secondary standard

- The Alanine/ESR secondary standard system was tested in the two reference UHPDR electron beams at PTB



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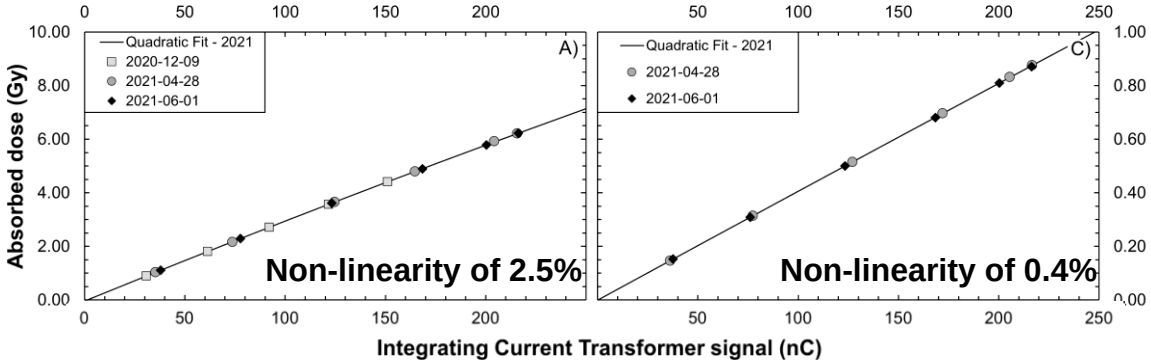

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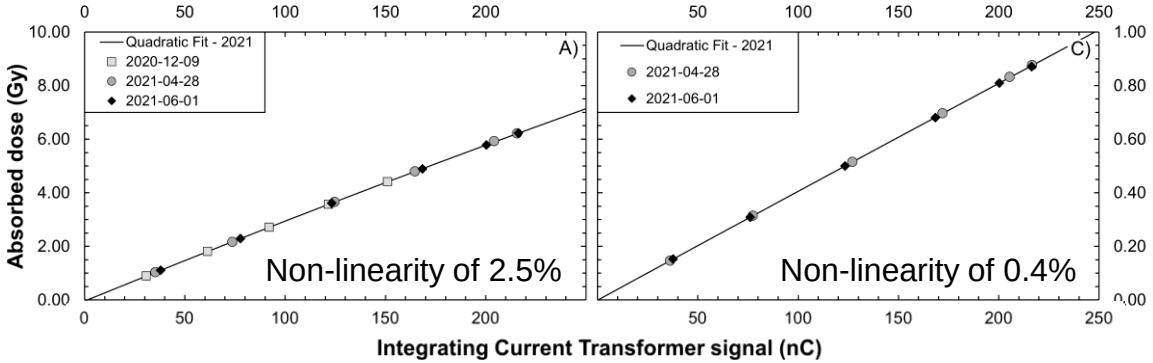

Explained by the increase of the divergence of the beam with dose per pulse
Behavior reproduced using Monte Carlo simulations

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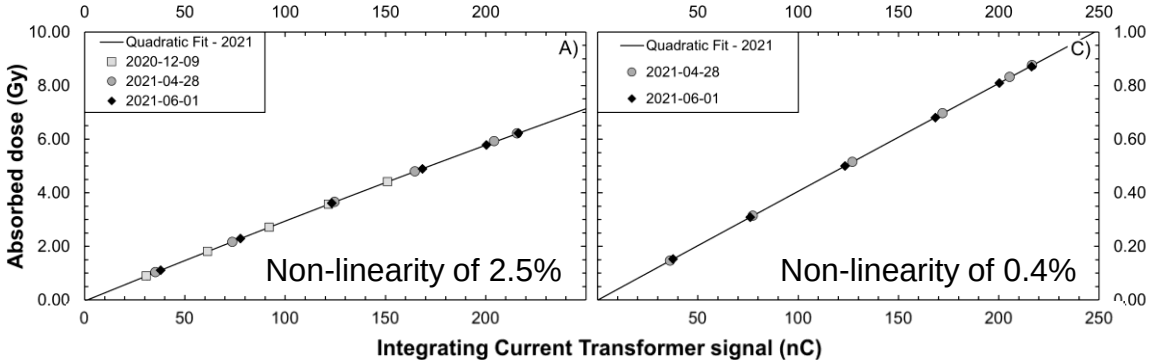

Uncertainty, k=1, 0.68%

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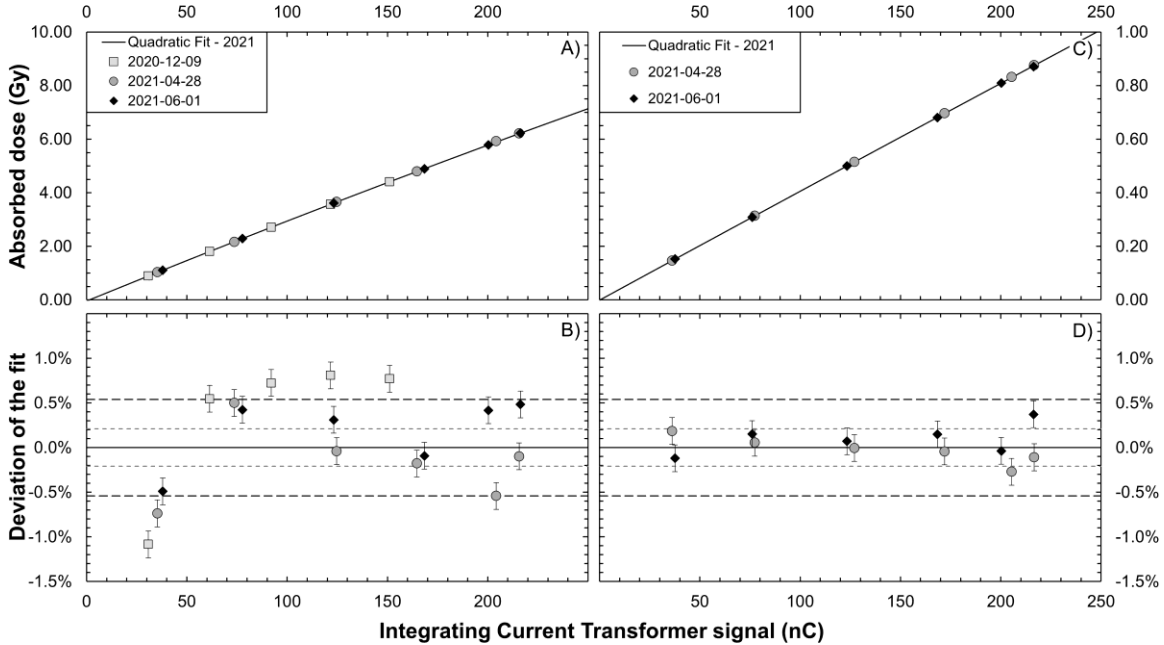

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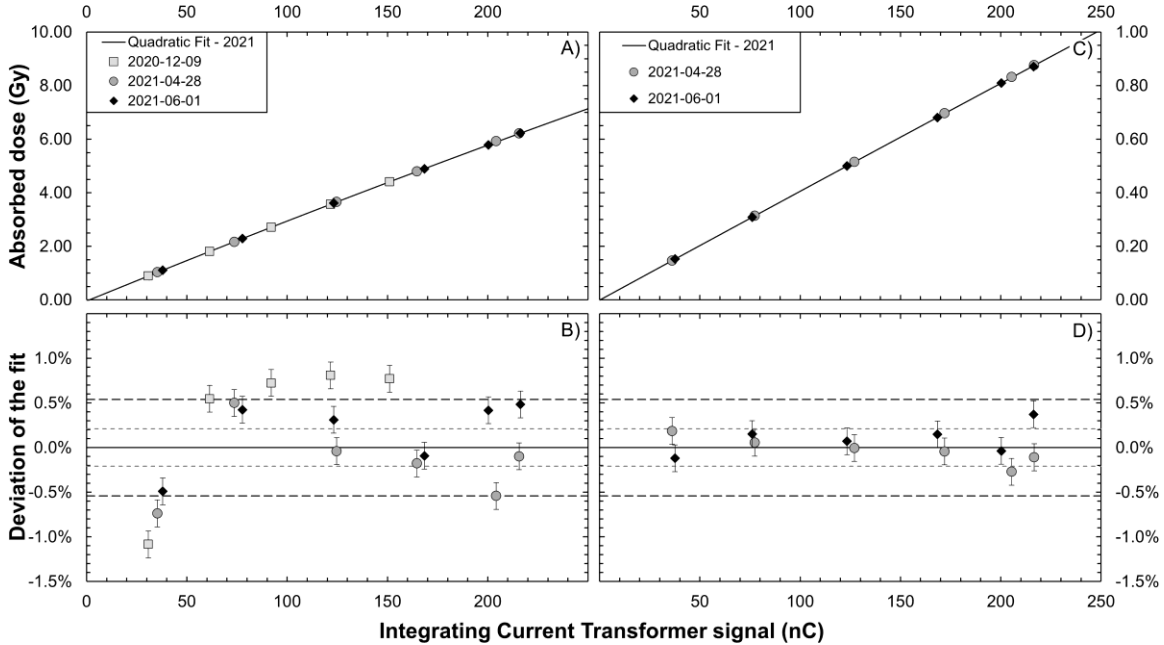

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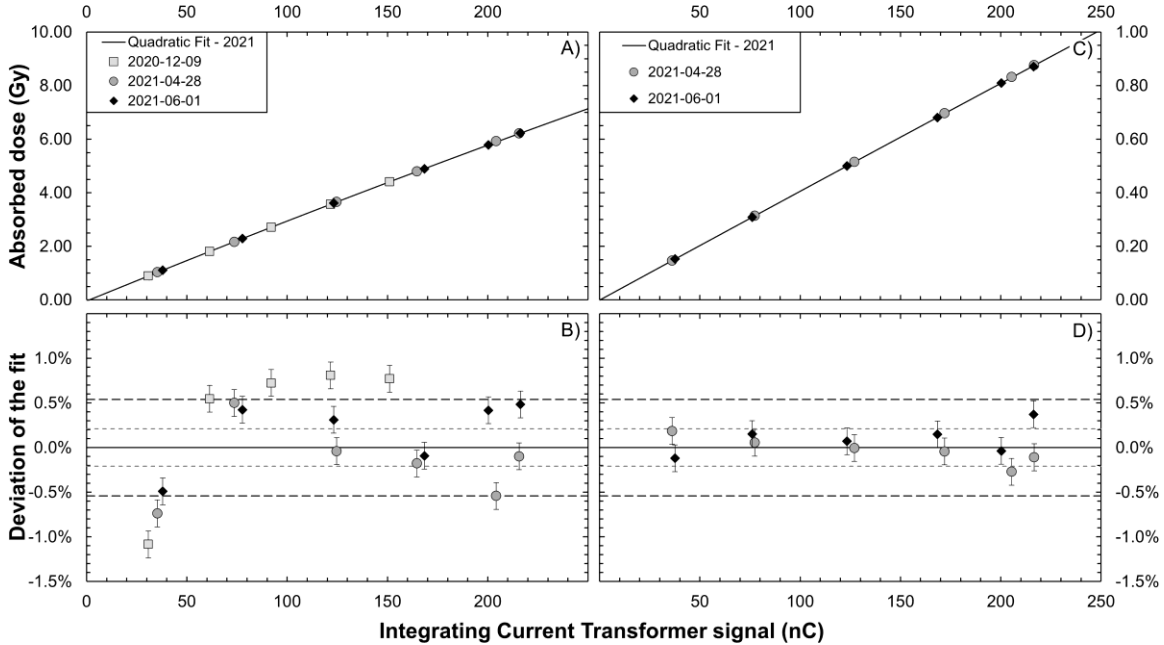

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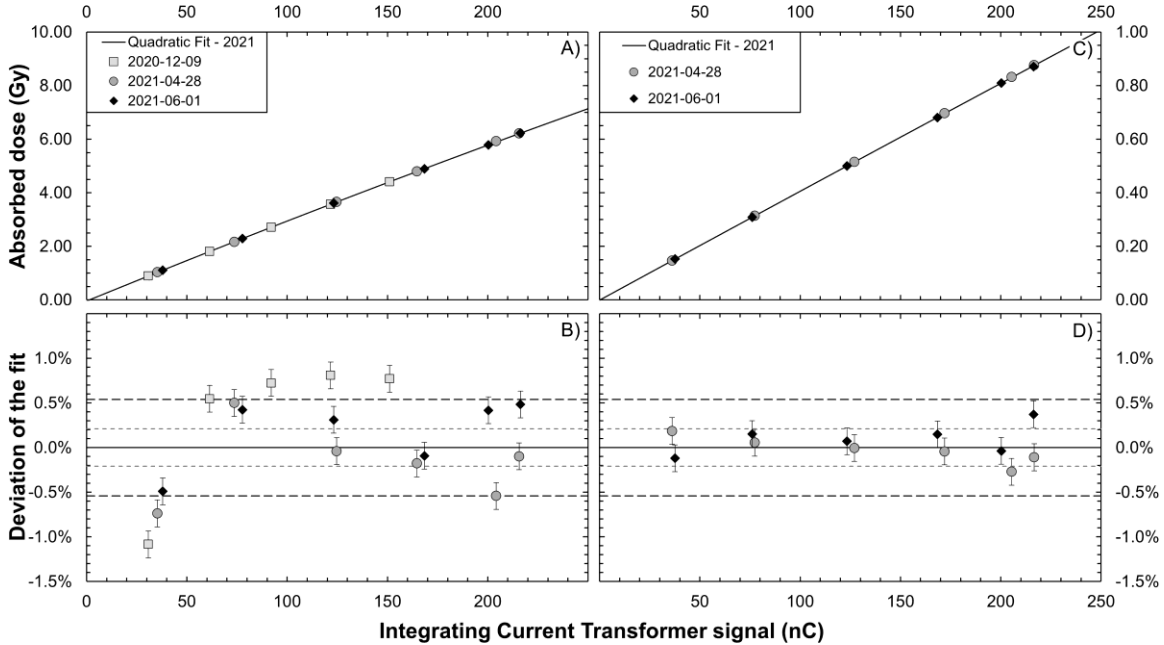

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-> Publication in PMB journal in 2022

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- EDGE diode detector (and array)

  In collaboration with Sun Nuclear corp.

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- Seven ion chamber model
  - 6 plane-parallel models
  - 1 cylindrical model (FC65-G)
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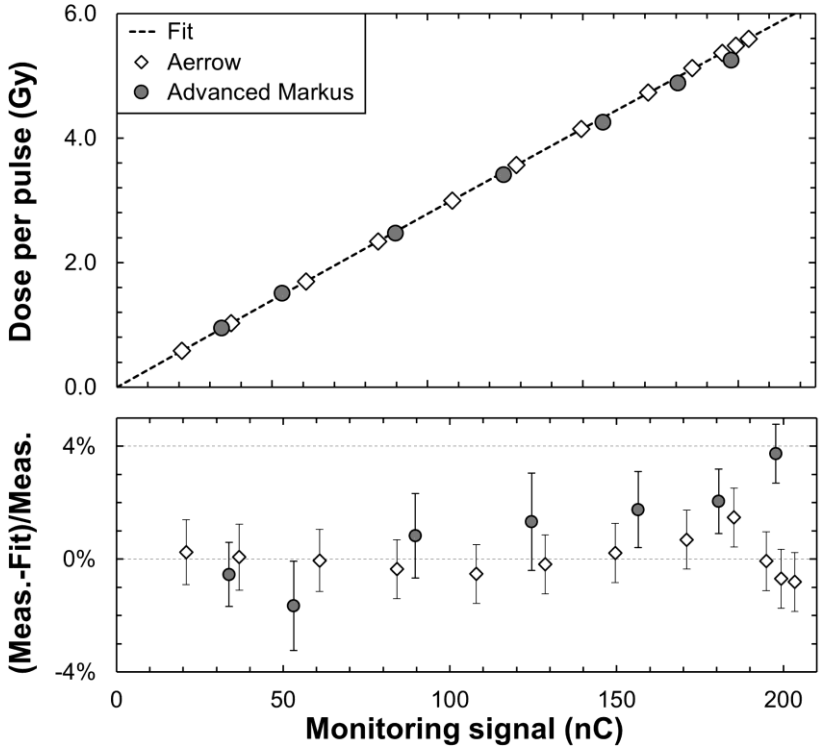
- Results presented at FRPT 2021, paper is a work in progress

Results highlight

- Consistency between the measurement with the graphite calorimeter probe Aerrow and an Advanced Markus



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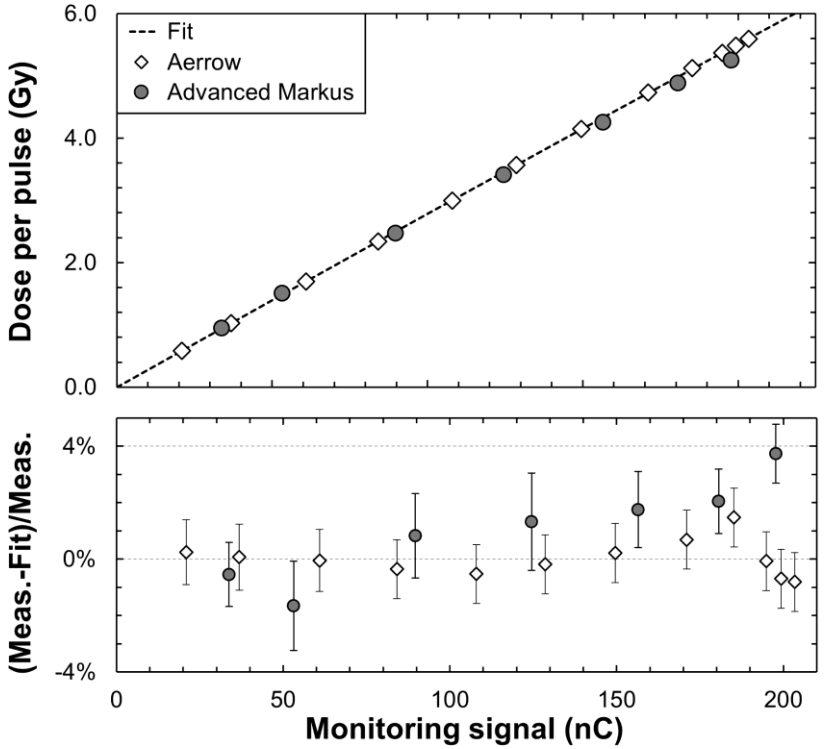

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  ~ 15 MeV, 3 Hz, 3.0 µs

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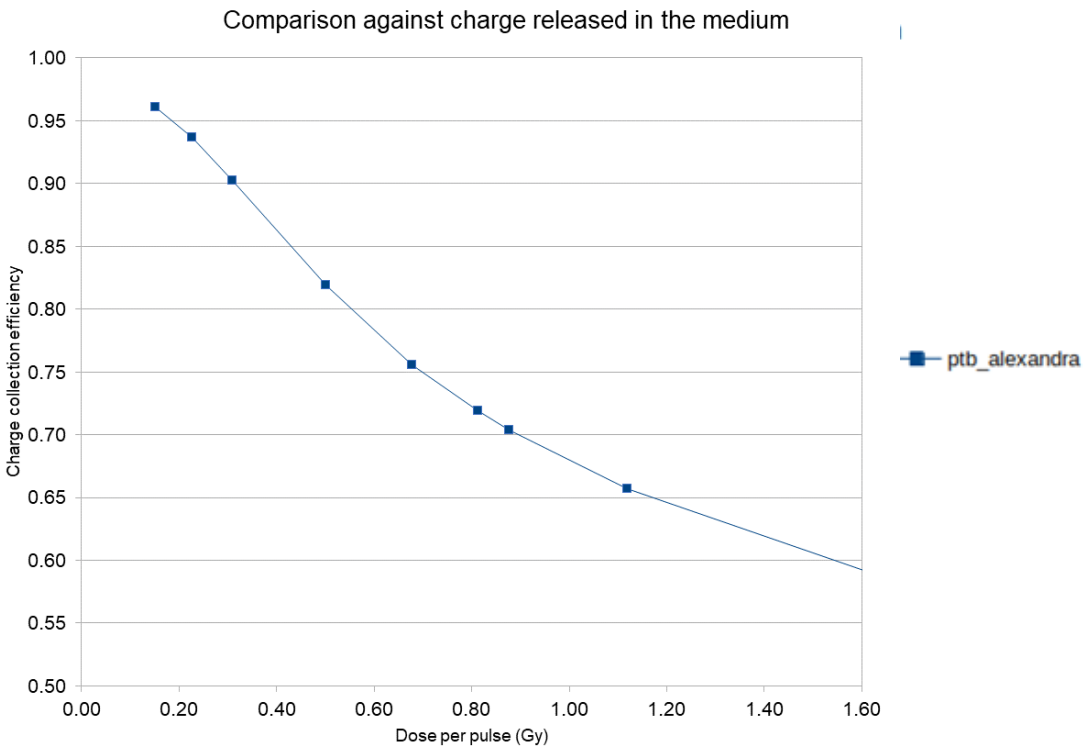

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  ~ 15 MeV, 3 Hz, 3.0 µs
- Difference up to **4%** observed

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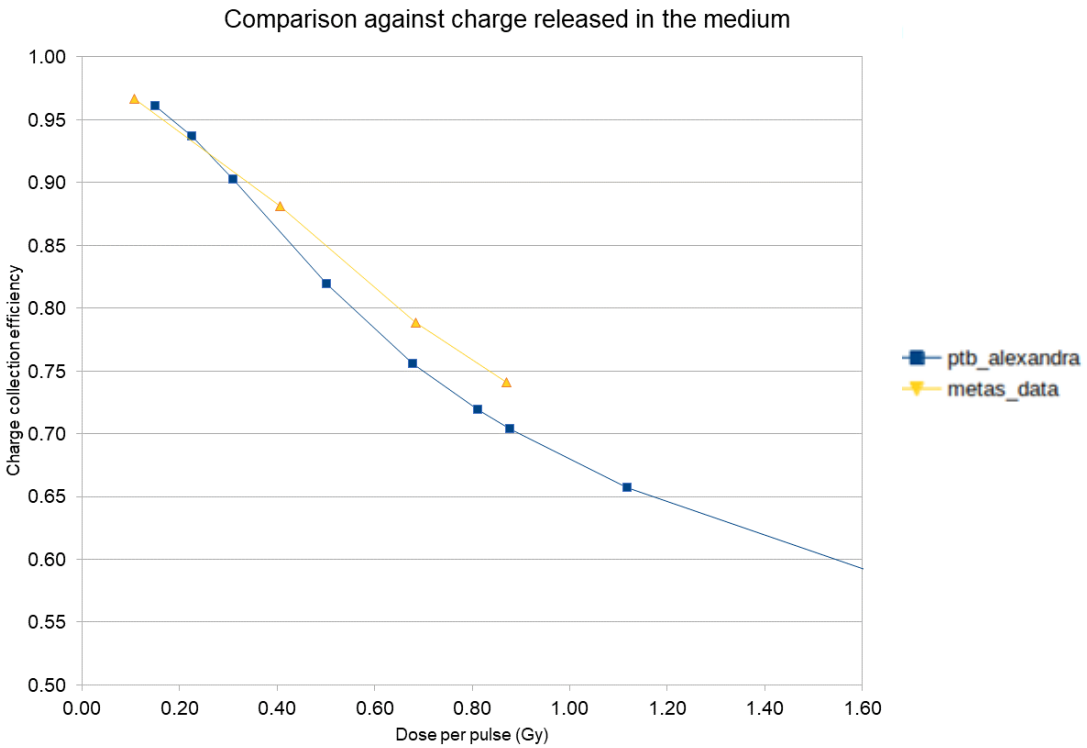

Results highlight

- Difference is explained by the difference in air pressure!

  PTB: ~ 101 kPa
  METAS: ~ 96 kPa

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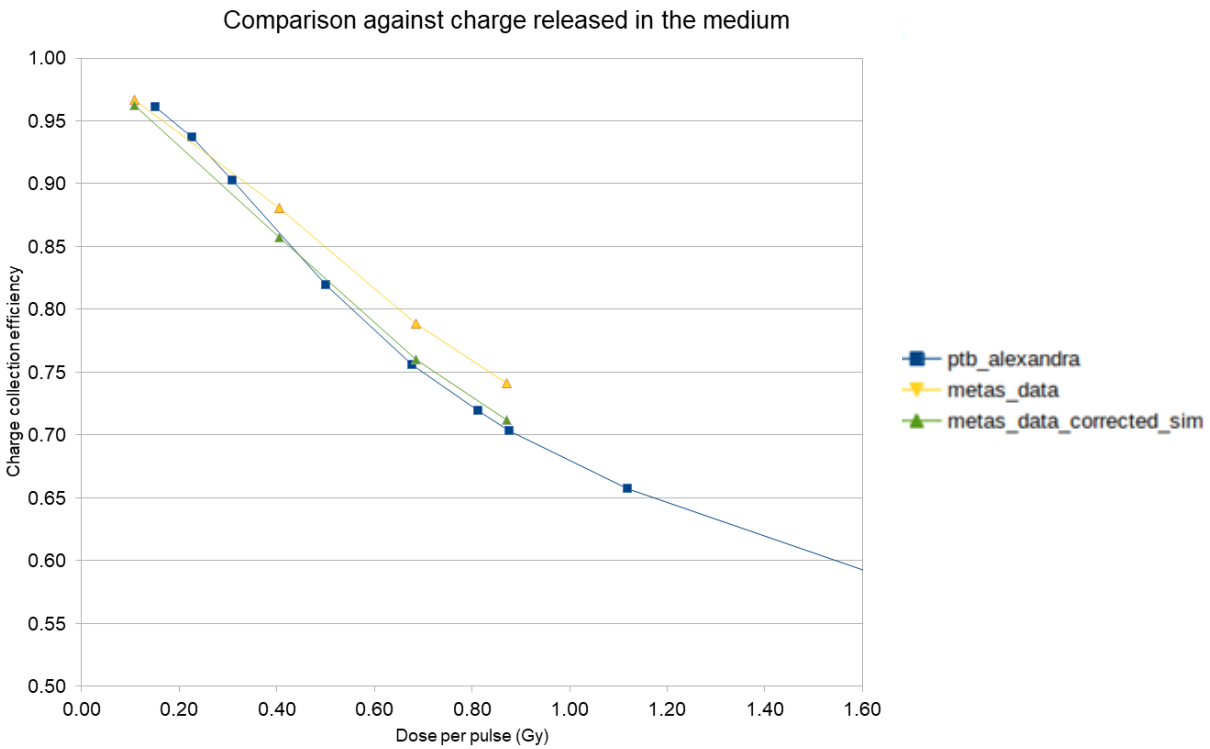

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- Characterisation of commercially available ionisation chambers as secondary dosimetry standards have been done

  Best uncertainty with IC as secondary standard is estimated to be 2%

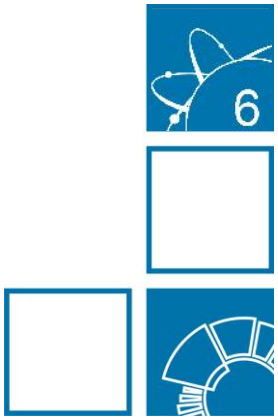
Acknowledgments

http://uhdpulse-empir.eu/

Yunus Can Gedik
Franziska Frei
Faustino G. Rodriquez
Thomas Hackel
Federico Keszti
Jakub Kozelka
Rafael Kranzer
Christoph Makowski
Marco Marinelli
Bryan Muir
Jose Paz Martin
Peter Peier
James Renaud
Andreas Schönfeld
Andreas Schüller
Olaf Tappe

This project 18HLT04 UHDpulse has received funding from the EMPIR programme co-financed by the Participating States and from the European Union's Horizon 2020 research and innovation programme.

EMPIR EURAMET
The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States



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Merci
Thank you
Dankeschön