

Rosana Martinez Turtos

PHD IN PHYSICS · ASSISTANT PROFESSOR

 [Orcid ID 0000-0002-1077-4849](https://orcid.org/0000-0002-1077-4849)

Experimental physicist with a solid background in nuclear instrumentation, development of state-of-the-art ionizing radiation detectors, single photon counting techniques and Monte Carlo assisted particle-tracking tools. Proven ability to transfer knowledge and connect broad areas of scientific research going from material science, lasers & optics to emerging nanotechnologies.

Scientific focus, Interested in the physics of multi-excitonic photon emission processes in semiconductor nanocrystals and wide band gap dielectric materials, together with energy storage and energy transfer mechanisms in inorganic-organic composites.

Education

PhD in Physics and Astronomy

UNIVERSITÀ DEGLI STUDI DI MILANO-BICOCCA, UNIMIB

• Thesis: “Prompt photon emission - A novel approach towards highest time resolution with scintillators”,

Milano, Italy
Nov 2013-April 2017

MSc in Nuclear Physics

HIGHER INSTITUTE OF TECHNOLOGIES AND APPLIED SCIENCE, INSTEC

Havana, Cuba
Sept 2006-July 2011

Work Experience

Assistant Professor at Aarhus University

DEPARTMENT OF PHYSICS & ASTRONOMY

Aarhus, Denmark
August, 2021

Post-doc at Aarhus University

DEPARTMENT OF PHYSICS & ASTRONOMY

Aarhus, Denmark
Sept. 2019 - Jul. 2021

Maternity leave

2020, 2024

Research fellow at the European Organization for Nuclear Research

CRYSTAL CLEAR R&D GROUP, DEPARTMENT OF EXPERIMENTAL PHYSICS

CERN, Geneva
May 2017-August 2019

Early Stage Researcher at the Università degli Studi di Milano-Bicocca

RECRUITED IN THE FRAME OF THE PICOSEC MARIE CURIE INITIAL TRAINING NETWORK PROJECT

UniMIB, Milano
February 2013-April 2017

Grants, Honors & Awards

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| 2023 | First poster prize at the Annual meeting of the Danish Physical Society , Poster by Simon Jessen: “Can CdSe nanoplatelets improve the time resolution of TOF-PET scanners” | Nyborg, DK |
| 2022 | Inge Lehmann grant from the Danish Research Council , PI of Project: “Finding the point of interaction of single gamma photons” funded with 2.8M DKK for 4 years | Aarhus, DK |
| 2021 | RECRUIT grant from the Novo Nordisk Foundation , PI of Project: “Harnessing Prompt Photon emission in nanocomposite scintillators: a path to on-the-fly cancer imaging” funded with 7M DKK | Aarhus, DK |
| 2021 | Roberts Best Paper Prize , “ Experimental time resolution limits of modern SiPMs and TOF-PET detectors exploring different scintillators and Cherenkov emission ” | Physics in Medicine and Biology |
| 2019 | Radiation Instrumentation Early Career Award of the IEEE Nuclear and Plasma Science Society , “For contributions to the development of scintillator meta-pixels toward 10ps time resolution” | Manchester, UK |
| 2017 | Summa cum laude , PhD in Physics and Astronomy | Milano, Italy |
| 2011 | Graduated with honors , MSc in Nuclear Physics | Havana, Cuba |

Supervision and management experience

- **2022- now** - PI of three different projects involving PhD students, international collaborators and a total budget of around 11M DKK. Main supervisor of PhD student Simon Jessen with thesis project **Ultrafast scintillation via quantum-confined excitons in 2D semiconductors** and PhD student Jacob Waming with thesis project **Finding the interaction point of single gamma photons: enabling next generation PET scanners**. Supervision of bachelor and master students in the topic of **Optically stimulated luminescence via self-trapped-exciton emission in intrinsic scintillators**.
- **2019-2023** - Co-supervision of PhD students **Camilla Lønberg Nielsen** and **Mads Lykke Jensen** in the framework of a multidisciplinary 3D dosimetry project.
- **2013-2019** - Contributing on a daily basis to the student supervision tasks in a research group hosting four PhD candidates and one MSc student @Crystal Clear group at CERN. Co-supervision of PhD Matteo Salomoni from Università degli Studi Milano-Bicocca, during his Technical/PhD studentship at CERN. Master thesis project: **Study of nanocrystals and photonic crystals applied to medical physics**. Doctoral thesis project: **Boosting scintillation based detection**. Co-supervision of BSc Leonor Frazão from Instituto Superior Técnico, Lisbon during her 4 months Internship at CERNv. Master thesis project: **Development of an innovative LSO-SiPM detector module for high-performance Positron Emission Tomography**.

International relations, Dissemination & Networking

2013-2023 - Worked in the framework of five interdisciplinary European projects¹, one Novo Nordisk Synergy founded project² and one international collaboration³ bringing together top-level academic institutions and industry in topics of ultrafast detector development for medical imaging, high-energy physics, novel positron emission tomography (PET) systems and innovative 3D dosimeters for high-resolution cancer treatment.

¹PicoSEC| EndoTOFPET | FAST | ERC TICAL (Grant 338953) | ASCIMAT

² 3D radiation dosimetry: Facilitating high-resolution cancer treatment | ³Crystal Clear Collaboration

Participated in several international conferences with more than 15 accepted abstract contributions. Invited speaker at the IV Mediterranean Thematic Workshop in Advanced Molecular Imaging, 2016 and Session chair at the IEEE Nuclear Science Symposium/MIC conference in 2017 and Fast Timing in Medical Imaging Workshop, Valencia 2022.

Publication summary

Citations > 800; current Hirsch index is 13 (Web of Science)

I have published 26 peer-reviewed papers and 7 conference proceedings, with 6 of them as first author and 2 as last author. The scientific papers include one in Physical Review Materials, one in Scientific Reports and five in Physics in Medicine and Biology. For a complete list of publications visit my [Google Scholar](#) or [ORCID](#) profile.

- C.L. Nielsen, P. Andričević, B. Julsgaard, M. Jain, P. Balling and **R. M. Turtos**, **The origin of room-temperature self-trapped-exciton emission in LiF nanoparticles**, *Physical Review Materials*, **7**, 106001, **2023**.
- M.L. Jensen, J.S. Nyemann, L. P. Muren, B. Julsgaard, P. Balling and **R. M. Turtos**, **Optically stimulated luminescence in state-of-the-art LYSO:Ce scintillators enables high spatial resolution 3D dose imaging**, *Scientific Reports*, **12**, 8301, **2022**.
- **Invited Topical Review: Roadmap toward the 10 ps time-of-flight PET challenge**, *Physics in Medicine & Biology*, **65**(21), **2020**. Contribution C4 - Perspectives on using nano-scintillators for fast timing applications .
- **R. M. Turtos**, S. Gundacker, S. Omelkov, B. Mahler, A. Khan, J. Shaaring, M. Kirm, C. Dujardin, A. Vasiliev, I. Moreels, E. Auffray, P. Lecoq, **On the use of CdSe scintillating nanoplatelets as time taggers for high-energy gamma detection**, *2D Materials and Applications*, **3**(37), **2019**.
- **R. M. Turtos**, S. Gundacker, E. Auffray, P. Lecoq, **Towards a metamaterial approach for fast timing in PET: experimental proof-of-concept**, *Physics in Medicine & Biology*, **64**(18), 185018, **2019**.
- **R. M. Turtos**, S. Gundacker, S. Omelkov, E. Auffray, P. Lecoq, **Light yield of scintillating nanocrystals under X-ray and electron excitation**, *Journal of Luminescence*, **215**, 116613, **2019**.
- **R. M. Turtos**, S. Gundacker, A. Polovitsyn, S. Christodoulou, M. Salomoni, E. Auffray, I. Moreels, P. Lecoq, J. Grim, **Ultrafast emission from colloidal nanocrystals under pulsed X-ray excitation**, *Journal of Instrumentation*, **11**(10), P10015 **2016**.
- **R. M. Turtos**, S. Gundacker, M. T. Lucchini, L. Procházková, V. Čuba, H. Burešová, J. Mrázek, M. Nikl, P. Lecoq, E. Auffray, **Timing performance of ZnO:Ga nanopowder composite scintillators**, *physica status solidi (RRL) - Rapid Research Letters*, **10**(11), 843-847 **2016**.
- **R. M. Turtos**, S. Gundacker, M. Pizzichemi, A. Ghezzi, K. Pauwels, E. Auffray, P. Lecoq, M. Paganoni, **Measurement of LYSO intrinsic light yield using electron excitation**, *IEEE Transactions on Nuclear Science*, **63**(2), 475-479 **2016**.