

Benedetto Di Ruzza, Ph.D.

(University of Foggia & INFN, Italy)

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Inspire-HEP Author: [1040590](https://inspirehep.net/authors/1040590)

Scopus Author ID: [35227195900](https://www.scopus.com/authid/detail.uri?authorId=35227195900)

Teaching web page (in italian language)

<https://sites.google.com/unifg.it/diruzza>



Education and qualifications

- **Ph.D.** in Physics (XXI Ciclo Dottorato):
“Measurement of the branching ratio of the charmless decay B_s to ϕ, ϕ at CDFII”
<http://inspirehep.net/record/1590216>
Physics Department, University of Trieste, Trieste (Italy). March 19th 2009
Tutors: Prof. Livio Lanceri, Dott.ssa Anna Maria Zanetti (University of Trieste and INFN Trieste).
- **Physics Masters Degree** (Laurea quadriennale vecchio ordinamento in Fisica):
“Aggiornamento delle funzioni di monitoring online del nuovo Silicon Vertex Tracker Trigger dell' esperimento CDF al Tevatron”.
Physics Department, Università degli Studi ‘La Sapienza’ di Roma (Italy). September 29th 2005.
Tutors: Prof.ssa Lucia Zanello, Dott. Marco Rescigno (University of Roma “La Sapienza” and INFN Roma1).
- **Abilitazione Scientifica Nazionale (ASN)**
02/A1 - Fisica Sperimentale Delle Interazioni Fondamentali, Seconda Fascia (July 2017)
- **The 2006 European School of High-Energy Physics** (formerly the CERN School of Physics).
Aronsborg, near Stockholm, Sweden, June 18– July 1, 2006

Publications

For my research activities I'm author or co-author of more than 500 articles in peer-review journals plus other e-prints. The full list of publications is available here:

Inspire-HEP Author: [1040590](https://inspirehep.net/authors/1040590) (<https://inspirehep.net/authors/1040590>)

Scopus Author ID: [35227195900](https://www.scopus.com/authid/detail.uri?authorId=35227195900)

(<https://www.scopus.com/authid/detail.uri?authorId=35227195900>)

Employment

- 31 October 2022 -Present: **University of Foggia (Foggia, Italy)**
DAFNE - Department of Agriculture, Food, Natural resources and Engineering
Tenure Track Assistant Professor in Experimental Physics (Ricercatore RTDb).
- March 2022 - 30 October 2022: **University of Cassino and Southern Lazio** (Cassino, Italy)
Contract Professor (Mechanical Engineering Department).
- April 2019 – May 2021: **TIFPA-INFN Center** (Trento, Italy)
Winner of Post-Doc Research Fellow (Assegno di Ricerca Scientifica).
- February 2016 – July 2017: **Department of Physics and Astronomy, Padova University**, (Padova, Italy).
Winner of Post-Doc Research Fellow (Assegno di Ricerca Scientifica) .
- May 2012 – May 2015: **Brookhaven National Laboratory** (Upton NY, USA)
Associate Research Scientist (Physics Department).
- July 2010 - May 2012: **Fermi National Accelerator Laboratory** (Batavia IL, USA)
Associate Research Scientist (Particle Physics Division).
- June 2009 - June 2010: **Fermi National Accelerator Laboratory** (Batavia IL, USA)
International Guest Scientist.
- April 2009 - March 2010: **University of Cassino and Southern Lazio** (Cassino, Italy)
Winner of Post-Doc Research Fellow (Assegno di Ricerca Scientifica) .
- February 2006 - March 2009: **Department of Physics University of Trieste (Trieste, Italy)**
Winner of Ph.D. Student fellowship.

Research activities

The fundamental motivation of my research activities is the interest for experimental particle physics. Pushed by this interest I had the privilege to work for long time in experiments located at the most relevant hadron colliders: Tevatron at FNAL, RHIC at BNL and LHC at CERN.

The participation to the CDF, STAR, ALICE experiments gave me the opportunity to contribute both to data analyses at the edge of the particle physics research (rare heavy flavor BR measurement; gauge bosons mass measurements) and to the construction, commissioning and running of sophisticated silicon sensors and data acquisition systems. My expertise in silicon detectors, and in general in experimental tracking apparatus, has been of pivotal importance for the research activities in medical physics (mainly in application of sensors to hadron therapy) and characterization of innovative silicon sensors I undertook from 2018 at the Trento TIFPA-INFN Laboratory in collaboration with the Fondazione Bruno Kessler (FBK) and I'm developing now in the FOOT-INFN collaboration and as member of the Bari Section of the Italian National Institute of Nuclear Physics (INFN).

List of my recent research activities

31 October 2022 - Present

University of Foggia, DAFNE Department & **Bari INFN** Section (Italy):

- University of Foggia & FBK: Studies for innovative dosimeters to be used in FLASH irradiation.
- Alice ITS3 and SVT-ePIC project: electrical characterization of thinned MAPS silicon sensors.

- FOOT-INFN experiment: MSD subdetector proton identification efficiency.
 - Alice Collaboration (CERN): PID quality checks in data reconstruction.
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Experiments

- 2025 -Present, **ePIC**: Electron-Proton/Ion Collider Experiment (BNL, USA)
<https://www.bnl.gov/eic/epic.php>
 - 2016 -2019, 2024- present, **ALICE**: A Large Ion Collider Experiment, LHC Collider (CERN, CH)
<https://alice-collaboration.web.cern.ch>
 - 2018 - Present, **FOOT**: FragmentatiOn Of Target
<https://web.infn.it/foot/en/home>
 - 2005 - Present, **CDF II**: Collider Detector at Fermilab, Tevatron Collider (FNAL, USA)
<https://cdf.fnal.gov>
 - 2012 - 2017, **STAR**: Solenoidal TrAcker at RHIC, RHIC Collider (Brookhaven National Laboratory, USA)
<https://www.bnl.gov/rhic/star.php>
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Editorial activities

- Review Editor for Frontiers in Physics (FPHY), section: High-Energy and Astroparticle Physics.
ISSN: 2296-424X, indexed in SCIE and Scopus
<https://www.frontiersin.org/journals/physics>
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International conferences organization

- ICECET2022 - International Conference on Electrical, Computer and Energy Technologies 2022:
Member of the Scientific Committee
<https://www.icecet.com/2022/>
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Past research activities:

2018-2022

TIFPA-INFN Trento Center(Italy) and Cassino University (Italy)

Hardware

- **Radiation hardness characterization of SiPM with Proton and x-ray.**
- **FOOT experiment:** test beam of the MSD (silicon strip detector) subdetector
- **4D_Phantom project** and proton facility electromagnetic background characterization.
- **Proton irradiation of silicon sensors for space experiments:** user facility support.

Data Analysis:

- **CDFII Collaboration**

Due to my experience and knowledge of the CDF Silicon Detector, I'm still involved in all the CDF Collaboration publications procedures. The last result is a publication on a high-precision measurement of the W boson mass performed using the full dataset collected by the CDF II Detector in the RunII data taking.

2016-2017

University of Padova (Italy), Department of Physics and Astronomy: Post-Doc

- Alice ITS upgrade

I spent the first 6 months of my Padova Physics department post-doc working in the Bari INFN clean room. There I worked at first in the the electrical characterization of the ALPIDE prototypes (pALPIDE3), and then gluing and testing first Outern Barrel Modules of the ALICE ITS Upgrade.

- iMPACT Project (Horizon 2020 grant agreement 64903)

After the experience on the ALPIDE chip developed in Bari, I realized in Padova traker set-up using a single ALPIDE chip and a Mosaic Board read-out system.

- LNL INFN Laboratories: SIRAD irradiation beam-line activity

Working in the Padova Group I had the possibility to increase my experience in ion-beams irradiation working as user support in the SIRAD irradiation beam-line at the LNL INFN Laboratories.

2012-2015

Brookhaven National Laboratory (BNL), Upton NY (USA)

Physics Department: Post Doc

Hardware:

Silicon Detector Development for a experiment in a EIC

- Geometry detector design using the EICRoot package https://wiki.bnl.gov/eic/index.php/BNL_Task_Force_Membership.
- MAPS qualification with laser and ion beams

Data Analysis: STAR Detector (RHIC collider)

2009-2012

Fermi National Accelerator Laboratory (FNAL or Fermilab), Chicago IL (USA).

Particle Physics Division (PPD):

International Fellow (2009-2010) and Research Associate (2010-2012).

Data Analysis: CDF II Detector

- B meson analysis
- Higgs boson analysis

Fermilab Hardware activities

- CDFII Silicon Operation Group

Since 2009 I had the responsibility of the maintenance of the CDF silicon detector power supply system monitor and maintenance (channels stability monitoring, modules test and replacement).

In 2010 I increase my involvement in CDF operations group becoming Sub Project Leader (**SPL**) of the Silicon Operation Group for the CDFII detector. As SPL I had the responsibility of silicon sensor efficiency monitoring, silicon aging studies, organization of access in the Detector area for elements replacement, coordination of the CDF silicon group, training of the new shifter on the CDF silicon detector data taking procedure.

- Silicon Detector Facility (SiDet) and Fermilab Test Beam Facility (FTBF).

After the Tevatron shut-down in September 2011 I worked at the I-V and C-V characterization of silicon strip detectors for the CMS Silicon Detector Upgrade (HPK Campaign) in the Fermilab Silicon Detector Facility (SIDEeT Facility, a class 10,000 clean room).

I also worked at silicon pixel test beam for the CMS upgrade in the T-992 R&D collaboration at the

Fermilab Test Beam Facility (<https://ftbf.fnal.gov/>) where I gave my contribution as pixel beam telescope operator and analyzing data results.

2004-2009

Tevatron Collider, CDF II Detector: Master thesis and PhD thesis

- I started my interaction with the CDFII detector working for my **master thesis**, when I extended the functionality of the SPYMON software to the new boards added to the CDF SVT hardware trigger in the 2005 CDFII upgrade. The SPYMON package was a software written in C language and implemented in VxWorks real time operative system used for the online efficiency monitor of the CDF SVT trigger. I keep the responsibility of the maintenance of this package until the Tevatron shut-down in 2011.
 - **PhD thesis data analysis:** Measurement of the Bs to phi, phi decay.
In this measurement I started from the cuts optimization for the event selection, I generated the Monte Carlo samples, then performed the channels efficiency optimization and the final BR measurement. The results of these analysis where published as FERMILAB-THESIS-2008-111 available here:
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Qualification schools and workshops attended

- RADECS Conference 2021, Qualification Course on:

- Space Radiation Environment and Total Ionizing Dose
- Single-Event Effects – Basic Mechanisms and Testing of Complex Devices
- Overview of ESA Cubesat Missions and Radiation Testing on Cubesat Electronics
- Laser Testing for Single-Event Effects: Basics and use cases
- Design and Testing of TID and SEE Radiation Hardened CMOS ASICs
Seibersdorf Laboratories, Austria; 13 Settembre 2021 (Virtual Conference)
<https://www.seibersdorf-laboratories.at/en/radecs-2021/conference/short-course>

– Advanced School on Quantum Detectors (SQUAD 2019)

Bruno Kessler Foundation (FBK), Trento, Italy; 18 - 20 September 2019.
<https://squad2019.fbk.eu/home>

– Workshop on Mathematics for Computer Vision 2018

Bruno Kessler Foundation (FBK), Trento, Italia; 15-16 Febbraio 2018.
<https://www.fbk.eu/en/event/workshop-mathematics-computer-vision-2018>

– INFN School of Statistics 2017

Ischia, Italy; 7th to 11th of May 2017
<https://agenda.infn.it/event/12288>

– 3rd National Course:

Detectors and Electronics for High Energy Physics, Astrophysics, Space Applications and Medical Physics
INFN Italian National Institute of Nuclear Physics, Legnaro Laboratories.
Padova, Italy; April 20-24, 2009.

<https://agenda.infn.it/event/1032>

- **INFN School for Grid Users** (experiments VIRGO, CDFII and ARGO)
Bologna (CNAF) Italy; October 6-9, 2008.
<https://agenda.cnaf.infn.it/conferenceDisplay.py?confId=168>
 - **The 2006 European School of High-Energy Physics** (formerly the CERN school of physics).
Aronsborg, near Stockholm, Sweden, June 18– July 1, 2006
<https://physicschool.web.cern.ch/2006/Aronsborg.html>
 - **ICTP/Democritos Joint Workshop on Tools for Computational Physics**
International Center for Theoretical Physics “Abdus Salam”.
Trieste Italy; March 6-11, 2006.
<http://indico.ictp.it/event/a05195>
 - **XVIII GIORNATE DI STUDIO SUI RIVELATORI** (Ph.D. School on high energy physics detectors),
Torino (Villa Gualino), Italy; February 28-March 3, 2006.
<http://www.gsr.unito.it/?Materiali&2006>
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Past Academia Activities

- **University Of Cassino and Southern Lazio** (Cassino, Italy), Department of Mechanical Engineering
Academic year 2021-2022. Contract professor of General Physics. Lessons, exercises and exams for freshman students.
- **University of Trento** (Trento, Italy), Department of Physics, Academic year 2018-2019:
Lessons, exercises and tutoring on Experimental Physics for freshman students.
- **Politecnico di Bari** (Bari, Italy), Department of Civil Engineering, Academic year 2015-2016.
Lessons, exercises and tutoring on General Physics for freshman students.
- **Stony Brook University** (Stony Brook NY, USA): March 2013 and March 2014.
Program: "[Women in Science & Engineering, Introduction to Science, Engineering, and Mathematics Research](#)": Teacher for the course WSE 187 - Introduction to Research
https://www.stonybrook.edu/sb/bulletin/current/archives/_pdfs/spring2013.pdf
- **University of Trieste** (Trieste, Italy).
 - ✓ Department of Physics, Academic year 2006-2007: lessons, exercises and tutoring on General Physics for freshman students.
 - ✓ Department of Civil and Environmental Engineering, Academic year 2007-2008: exercises and exams support on General Physics for freshman students.

Student thesis tutoring

- University of Trento, Department of Information Engineering and Computer Science (DIE)
Academic year 2019-2020, Student: Fabiola Caso, tutor for the laurea thesis:

Lessons in topical schools

- Fermilab, February 2012: **EDIT 2012 Symposium** (*Excellence in Detectors and Instrumentation*).
“Teaching Assistant for the Silicon Track”
<http://conferences.fnal.gov/EDIT2012/participants.html#TA>
- LNL INFN Laboratories, April 2011: 4th National Course: “Detectors and Electronics for High Energy Physics, Astrophysics, Space Applications and Medical Physics” for PhD students and researcher;
talk: **“Longevity Studies on the CDFII Silicon Detectors”**
<http://agenda.infn.it/contributionDisplay.py?contribId=12&confId=3245>

Education outreach and engagement

- October and November 2019, [Focus Live Workshops](#) and [Trento Smart City Week](#) festival:
guide for visitors in the Trento Proton Irradiation Facility and demonstration of simple particle tracking experiments using silicon detectors to the public. Activities described in this [ICHEP2020 talk](#)
(Proceeding: [PoS \(ICHEP2020\) 939](#); doi.org/10.22323/1.390.0939)
- Brookhaven National Laboratory (Upton NY, USA),
 - Summer Sunday 2013 and 2014 (BNL Open days): guide for visitors in the STAR Detector tour
 - November 2014: Member of the Brookhaven Young Research Symposium (YRS2014) Organization Committee (<https://www.bnl.gov/newsroom/news.php?a=24442>)
 - November 2012: Young Researcher Symposium 2012
talk “eRHIC: a New Collider to explore the fempto-scale structure of protons and nuclei”
<http://www.bnl.gov/bnlyrs2012/files/pdf/agenda.pdf>
 - December 2012 – March 2014:
Board Member of the Association of Students and Post-Doc at Brookhaven (ASAP):
in charge of the organization of post-doc cultural and networking activities.
 - May 2013 and May 2014: Judge for Suffolk County High Schools Science Fair.
- Stony Brook University (Stony Brook NY, USA),
 - September 2012: Post Doctoral Symposium
talk “eRHIC: A Quantum Super-Microscope to Investigate the 3D-Structure of the Nuclei”
by Benedetto Di Ruzza & Salvatore Fazio.
- Area Science Park (Area di Ricerca di Trieste, Italy)
 - May 2006: Open Day 2006
Guide for visitors in the Padriciano Campus Area Science Park INFN Laboratories

Recent talks and posters presented in Conferences and Workshops

- May 2024, **MIPRO 2024**: 47th MIPRO ICT and Electronics Convention .
20-24 May 2024, Opatija - Abbazia (HR);
talk: "**Flexible Nafion Sensor for Ionizing Radiation Based on a Microwave Resonating System**".
<https://ieeexplore.ieee.org/document/10569252>
- April 2022, **SiPM Radiation**: Quantifying Light for Nuclear, Space and Medical Instruments under Harsh Radiation Conditions. 25-25 April 2022, CERN, Virtual Conference;
talk: "**SiPM Irradiation and Characterization with proton and x-ray beams: the TIFPA-INFN facilities in Trento (Italy)**". <https://indico.cern.ch/event/1093102/contributions/4807098>
- March 2022, **ACP 2021**: African Conference of Fundamental and Applied Physics.
7-11 March 2022, Virtual Conference;
talk: "**X-ray technological irradiation for TID studies on silicon sensor and electronic devices in a medical facility**". <https://indico.cern.ch/event/1060503/contributions/4740690>
Proceeding: [arXiv:2206.05119](https://arxiv.org/abs/2206.05119) [physics.ins-det].
- December 2021, **IEEE-ICECET 2021**: International Conference on Electrical, Computer and Energy Technologies, 9-10 December 2021, Cape Town (South Africa); Virtual Conference;
talk: "**Experimental assessment of the electromagnetic background noise in the Trento Proton Therapy Center**"
<http://www.icecet.com/2021>
- February 2021, **LHCP 2021**: 9th Edition of the Large Hadron Collider Physics Conference
16-18 February 2021, Paris (France); Virtual Conference;
poster: "**Possibility of Total Ionizing Dose Effects measurements for LHC experiments elements in a medical facility: the TIFPA-INFN experience**"
<https://indico.cern.ch/event/905399/contributions/4335523>
- May 2021, **TIPP 2021**: 5th International Conference on Technology and Instrumentation in Particle Physics
24-28 May 2021, Vancouver (Canada); Virtual Conference
talk: "**Fragmentation Measurements in Particle Therapy: status and plans of the FOOT experiment**"
<https://indico.cern.ch/event/981823/contributions/4293505/>
- February 2021, **TREDI 2021**: "16th Workshop on Advanced Silicon Radiation Detectors"
16-18 February 2021, Trento (Italy); Virtual Workshop;
talk: "**Ionizing and Non-Ionizing Energy Loss irradiation studies with 70-230 MeV protons at the Trento Proton Therapy Center**"
<https://indico.cern.ch/event/983068/contributions/4223200>
- February 2021, **BTTB9**: "9th edition of the Beam Telescopes and Test Beams Workshop"
8-11 February 2021, Lecce (Italy); Virtual Workshop
talk: "**Physics and Radiobiology Experimental Beam Tests at the Trento Proton Therapy Center**"
<https://indico.cern.ch/event/945675/contributions/4160465>

- September 2020, **SIF 2020**: Annual National Congress of the Italian Physical Society
14-18 September 2020; Milano (Italy)
talk "*4DPhantom: An innovative device for oncological proton treatment uncertainties minimization*".
<https://agenda.infn.it/event/23656/contributions/120640/>
 - July 2020, **ICHEP 2020**: 40th International Conference on High Energy Physics
Praga (Cechia) July 28 - August 6, 2020;
 - ✓ Parallel session #15: Education and Outreach.
talk "*Proton and x-ray irradiation of silicon devices at the TIFPA-INFN facilities in Trento (Italy)*"
<https://indico.cern.ch/event/868940/contributions/3815732/>
 - ✓ Parallel session #15: Education and Outreach.
talk "*Education initiatives in the experimental area of the Trento Proton Therapy Center (Italy)*"
<https://indico.cern.ch/event/868940/contributions/3814048/>
 - October 2016, **IPRD 2016**: 14th Topical Seminar on Innovative Particle and Radiation Detectors
October 3 – 6, Siena, Italy;
talk "*The pixel module of the new Inner Tracking System of ALICE at LHC*"
https://www.bo.infn.it/sminiato/iprd16/03_Mercoledi/Mattina/10_DiRuzza.pdf
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Foggia 10/04/2025

Benedetto Di Ruzza

