Giulia Casarosa

Scientific Education and Employment

since 07/2022	Associate Professor at Dipartimento di Fisica dell'Università di Pisa.
07/2019-06/2022	Senior Researcher at Dipartimento di Fisica dell'Università di Pisa.
09/2017-06/2019	Junior Researcher at Dipartimento di Fisica dell'Università di Pisa.
09/2016-08/2017	Humboldt Fellowship for Young Researchers, at Johannes Gutenberg Universität (Mainz), financed project "Improving the low-transverse-momentum particles reconstruction at the *BelleII* experiment using non-standard tracking algorithms"
08/2014-07/2016	Assegno di Ricerca (post-doc) at INFN - Sezione di Pisa
08/2012-07/2014	Assegno di Ricerca (post-doc) at INFN - Sezione di Pisa
2012 (6 months)	Visiting Scientist in the *BABAR* Collaboration at the SLAC National Accelerator Laboratory, Menlo Park, CA;
03/12/2012	PhD, Scuola di Dottorato "Galileo Galilei", Università di Pisa, "*Measurement of Mixing and CP Violation in the Two-Body D^0 decays to $K^+K^-, \pi^+\pi^-$ and $K^\pm\pi^\mp$ with the BABAR Experiment*"

Teaching

* PhD Thesis Supervision

XXXVIII Ciclo	Ludovico Massaccesi: "*Search for CP Violation in the $D^0 \to \pi^+ \pi^- \pi^0$ decays at BelleII*", co-supervisor with Prof. F. Forti, in progress

* Master Thesis Supervision

A.A. 2023/2024	Matilde Carminati: "*Improving K_S reconstruction at BelleII*", in progress
A.A. 2021/2022	Silvia De Benedictis: "*Studio sulla stima del tempo dell'evento con il rivelatore SVD di BelleII*", co-supervisor with Prof. F. Forti
A.A. 2021/2022	Alberto Lorenzini: "*Analisi del materiale del rivelatore di vertice di BelleII e caratterizzazione di prototipi per possibili sviluppi futuri*", co-supervisor with Prof. S. Bettarini
A.A. 2018/2019	Gaetano de Marino: "*D^0 lifetime Measurement with BelleII Early Data*", co-supervisor with Prof. F. Forti

* Academic Courses

A.A.2023/2024	teaching Fisica Generale, Ingegneria Civile Ambientale Edile (120h); co-teaching Laboratorio di Fisica 1, Fisica (40h);
A.A.2022/2023	teaching Fisica Generale, Ingegneria Civile Ambientale Edile (80h); co-teaching Laboratorio di Fisica 1, Fisica (20h);

A.A.2021/2022	co-teaching Fisica Generale, Ingegneria Civile Ambientale Edile (50h); co-teaching Laboratorio di Fisica 1, Fisica (30h);
A.A.2020/2021	co-teaching Fisica Generale, Ingegneria Civile Ambientale Edile (40h); co-teaching Laboratorio di Fisica 1, Fisica (40h);
A.A.2019/2020	co-teaching Fisica Generale, Ingegneria Civile Ambientale Edile (40h); co-teaching Laboratorio di Fisica 1, Fisica (40h);
A.A.2018/2019	co-teaching Fisica Generale 1, Ingegneria Civile Gestionale (20h); co-teaching Laboratorio di Fisica 1, Fisica (40h);
A.A.2017/2018	co-teaching Fisica Generale 1, Ingegneria Civile Elettronica (20h); co-teaching Laboratorio di Fisica 1, Fisica (40h);
earlier than 2016	teaching support Fisica 1, Fisica (30h) and Fisica Generale 1, Ingegneria Civile;

Experiments & Scientific Projects

2022 - today	member of the PDG Collaboration
2021/2022	Principal Investigator of the University Research Project (PRA 2020-2021): "*Sviluppo di tracciatori di particelle cariche con sensori CMOS monolitici, sottili e veloci*"
2013 - today	member of the *BelleII* Collaboration
2010 - today	member of the *BABAR* Collaboration
2010 - 2012	member of the SuperB Collaboration

Coordination Roles

* physics & software at *BelleII*

03/2014 - 04/2024	co-convener of the charm physics working group
11/2020 - today	co-coordinator of the Tracking & Vertexing group
10/2020-11/2023	coordinator of the Timing & EventT0 group
06/2017-06/2021	SVD (Silicon Vertex Detector) software coordinator

Scientific Services

* Article Review

since 02/2022	Reviewer, Journal of Instrumentation
since 05/2021	Reviewer, Physical Review D
since 07/2018	Reviewer, Nuclear Inst. and Methods in Physics Research, A Proceedings
since 02/2018	Reviewer, Nuclear Inst. and Methods in Physics Research, A

∗ Other

since 09/2022	PDG Encoder for D^+, D^0, D_s^+ mesons, charmed and doubly-charmed baryons
2023	co-convener of the Reconstruction and Software Triggers Working Group of the HEP Software Foundation

Main Research Activity Summary

∗ Charm Physics at *BelleII* and *BABAR*

I've directly worked on several charm analyses at the *BABAR* and *BelleII* experiments, on measurements of the **mixing and the search for CP violation**, and **high precision measurements of Standard Model parameters like widths and lifetimes** of charm hadrons.

∗ Hardware & Software at *BelleII* & PRA 2020/2021

On the hardware side, I am involved in the **R&D of fast, thin tracking detectors to be used at high-luminosity machines**. At the beginning of my career I specifically worked to VHDL simulation of a readout architectures of a matrix with in-pixel timestamping and sparsification, with a target rate of 100 MHz/cm^2, electrical characterization of pixel sensors prototypes (hybrid pixels & MAPS) with in-pixel timestamping and sparsification and beam tests. I am now involved in the upgrade plans for the *BelleII* vertex detector from the point of view of the tracking performance, (in the context of PRA 2020/2021 and later).

As tracking co-coordinator, I'm responsible for the tracking software, performance, corrections and corresponding systematic uncertainties. Before becoming coordinator of the tracking group, among the many activities (mostly related to the tracking with the silicon vertex detector), I have studied in details the features and **performance of the tracking software**, including displaced vertices reconstruction. I have developed the software for the Region of Interest (ROI) on the PiXel Detector (PXD) layers, employed on the high level trigger, that allows to reduce the storage and bandwidth needed for the PXD data.

I have redesigned and reimplemented the **reconstruction software of the Silicon Vertex Detector** (SVD), adding missing parts (e.g. calibration) and improving of the existing ones (hit time, execution time, position resolution), and then measured the performance of the SVD with first collision data.

I was responsible of the electric qualification of the forward and backward modules of the SVD built in INFN clean rooms in Pisa. I have developed the software for the classification of the sensor defects, used then in all construction sites.

Prior to the start of *BelleII* data taking, I participated in 3 beam tests at DESY in which we tested vertex detector prototype, the acquisition chain (including ROIs & pixel selection) and the tracking software.

Selection of Recent Publications

The list of all 294 publications can be found at https://arpi.unipi.it/cris/rp/rp05914.

1. F. Abudinén *et al.* [Belle-II], "Precise measurement of the D^0 and D^+ lifetimes at Belle II," Phys. Rev. Lett. **127**, no.21, 211801 (2021).

2. V. Bertacchi *et al.* [Belle II Tracking Group], "Track finding at Belle II," Comput. Phys. Commun. **259**, 107610 (2021).

3. G. Rizzo *et al.* [Belle-II SVD] "The Belle II Silicon Vertex Detector: Performance and Operational Experience in the First Year of Data Taking," JPS Conf. Proc. **34**, 010003 (2021).

4. E. Kou *et al.* [Belle-II], "The Belle II Physics Book," PTEP **2019**, no.12, 123C01 (2019) [erratum: PTEP **2020**, no.2, 029201 (2020)].

Seminars & International Conferences

* Seminars

I was invited to give few seminars on Mixing and CP Violation in charm, and on the *BelleII* Silicon Vertex Detector at Bonn University, Johannes Gutenberg-Universiẗ(Mainz) and at the SLAC Stanford Linear Accelerator Center

* Oral Presentations

The presentations at international conferences in the last 5 years are reported below. Before that, I have presented 12 times at international conferences (e.g. CKM, CHARM, ICHEP and EPS) about charm physics and tracking detectors.

01/2023	59^{th} Winter Meeting on Nuclear Physics, Bormio "*Recent Results from BelleII*"
09/2021	XV International Conference on Heavy Quarks and Leptons, Online "*D mesons lifetimes at BelleII*"
07/2020	ICHEP 2020, Online "*Charm Potential at BelleII*"
04/2019	Connecting the Dots 2019, Valencia "*Performance of the BelleII Silicon Vertex Detector and Standalone Track Finder*"
02/2019	Vienna Conference of Instrumentation, Vienna "*Commissioning of the BelleII Silicon Vertex Detector*"

Pisa, March 8^{th} 2024

Giulia Casarosa