



September 12, 2023

Personal information

Surname / First name

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Zucchetti Carlo

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Professional experiences

Dates (from – to)

Position

Name and address of organization

02/2022 → *present*

Assistant Professor “Junior” (RTDA)

Politecnico di Milano – Physics department

Dates (from – to)

Position

Name and address of organization

01/2019 – 01/2022

Postdoctoral Researcher in Physics

Politecnico di Milano – Physics department

Dates (from – to)

Position

Name and address of organization

11/2015 – 10/2018

PhD student in Physics

Politecnico di Milano – Physics department

Education and training

Date

Title of qualification awarded

Name and type of organization

03/2019

PhD in Physics cum Laude

Politecnico di Milano (University)

Date

Title of qualification awarded

Curriculum

Name and type of organization

09/2015

Master's degree in Engineering Physics cum Laude

Nanotechnology and Physics Technologies

Politecnico di Milano (University)

Teaching activity and concepts

Since the 1st semester of the academic year 2016/2017 I am Teaching Assistant of classical physics for the Bachelor's degree courses of Engineering at Politecnico di Milano. In the courses where I have been Teaching Assistant, I covered the following topics: classical mechanics, thermodynamics, electrostatics, magnetostatics, electromagnetism, waves, optics. The 2nd semester of the academic year 2022/2023 I started the activity of Professor of classical physics (rigid body, fluid statics, thermodynamics) for the Bachelor's degree courses of Engineering at Politecnico di Milano. Since 2017 I have been training students on laboratory activities for the Bachelor's and Master's degree and PhD, in some cases being the supervisor of the final thesis work (for Bachelor's and Master's degree students).

Research activity

Concepts

My research activity is focused on semiconductor spintronics, i.e. the generation, the transport and the detection of spin-polarized electrons in semiconductor-based structures.

Conferences	I participate several international conferences in the field of material science, magnetism and spintronics with either oral and invited contributions.
Publications	I'm author of 28 publications on international journals of Physics, mainly in the field of semiconductor spintronics. They have been cited 284 times (source: Scopus). My h-index is 12 (source: Scopus).

Complete list of publications

- [1] F. Bottegoni, A. Calloni, G. Bussetti, A. Camera, C. Zucchetti, M. Finazzi, L. Duò, and F. Ciccacci, "Spin polarized surface resonance bands in single layer Bi on Ge(111)", *Journal of Physics: Condensed Matter* **28** (2016), 195001–6
- [2] M. Finazzi, F. Bottegoni, C. Zucchetti, M. Bollani, A. Ballabio, J. Frigerio, F. Rortais, C. Vergnaud, A. Marty, M. Jamet, G. Isella, and F. Ciccacci, "Optical Orientation and Inverse Spin Hall Effect as Effective Tools to Investigate Spin-Dependent Diffusion", *Electronics* **5** (2016), 80–12
- [3] F. Bottegoni, C. Zucchetti, M. Finazzi, G. Isella, and F. Ciccacci, "Pure spin currents in Ge probed by inverse spin-Hall effect", *AIP Advances* **7** (2017), 055907–5
- [4] F. Bottegoni, C. Zucchetti, F. Ciccacci, M. Finazzi, and G. Isella, "Optical generation of pure spin currents at the indirect gap of bulk Si", *Applied Physics Letters* **110** (2017), 042403–5
- [5] F. Bottegoni, C. Zucchetti, S. Dal Conte, J. Frigerio, E. Carpena, C. Vergnaud, M. Jamet, G. Isella, F. Ciccacci, G. Cerullo, and M. Finazzi, "Spin-Hall Voltage over Large Length Scale in Bulk Germanium", *Physical Review Letters* **118** (2017), 167402–5
- [6] C. Zucchetti, F. Bottegoni, C. Vergnaud, F. Ciccacci, G. Isella, L. Ghirardini, M. Celebrano, F. Rortais, A. Ferrari, A. Marty, M. Finazzi, and M. Jamet, "Imaging spin diffusion in germanium at room temperature", *Physical Review B* **96** (2017), 014403–5
- [7] C. Zucchetti, F. Bottegoni, A. Calloni, G. Bussetti, L. Duò, M. Finazzi, and F. Ciccacci, "Evolution of the structural and electronic properties of thin Bi films on Ge(111)", *Journal of Physics: Conference Series* **903** (2017), 012024–4
- [8] F. Rortais, C. Vergnaud, A. Marty, L. Vila, J.-P. Attané, J. Widiez, C. Zucchetti, F. Bottegoni, H. Jaffrès, J.-M. George, and M. Jamet, "Non-local electrical spin injection and detection in germanium at room temperature", *Applied Physics Letters* **111** (2017), 182401–5
- [9] C. Zucchetti, F. Bottegoni, G. Isella, M. Finazzi, F. Rortais, C. Vergnaud, J. Widiez, M. Jamet, and F. Ciccacci, "Spin-to-charge conversion for hot photoexcited electrons in germanium", *Physical Review B* **97** (2018), 125203–7
- [10] F. Bottegoni, C. Zucchetti, G. Isella, E. Pinotti, M. Finazzi, and F. Ciccacci, "Modeling the photo-induced inverse spin-Hall effect in Pt/semiconductor junctions", *Journal of Applied Physics* **124** (2018), 033902–6
- [11] C. Zucchetti, M.-T. Dau, F. Bottegoni, C. Vergnaud, T. Guillet, A. Marty, C. Beigné, S. Gambarelli, A. Picone, A. Calloni, G. Bussetti, A. Brambilla, L. Duò, F. Ciccacci, P.K. Das, J. Fujii, I. Vobornik, M. Finazzi, and M. Jamet, "Tuning spin-charge interconversion with quantum confinement in ultrathin bismuth films", *Physical Review B* **98** (2018), 184418–7
- [12] M. Finazzi, F. Bottegoni, C. Zucchetti, G. Isella, and F. Ciccacci, "Paramagnon-Enhanced Spin Currents in a Lattice near the Curie Point", *Scientific Reports* **8** (2018), 17108–7
- [13] C. Zucchetti, G. Isella, F. Ciccacci, M. Finazzi, and F. Bottegoni, "Spin transport and spin-charge inter-conversion phenomena in Ge-based structures", *Proceedings of SPIE: Spintronics XII* **11090** (2019), 1109033–10

- [14] C. Zucchetti, M. Bollani, G. Isella, M. Zani, M. Finazzi, and F. Bottegoni, "Doping dependence of the electron spin diffusion length in germanium", *APL Materials* **7** (2019), 101122–6
- [15] T. Guillet, C. Zucchetti, Q. Barbedienne, A. Marty, G. Isella, L. Cagnon, C. Vergnaud, H. Jaffrès, N. Reyren, J.-M. George, A. Fert, and M. Jamet, "Observation of Large Unidirectional Rashba Magnetoresistance in Ge(111)", *Physical Review Letters* **124** (2020), 027201–5
- [16] F. Bottegoni, C. Zucchetti, G. Isella, M. Bollani, M. Finazzi, and F. Ciccacci, "Spin-charge interconversion in heterostructures based on group-IV semiconductors", *La Rivista del Nuovo Cimento* **43** (2020), 45–52
- [17] C. Zucchetti, A. Ballabio, D. Chrastina, S. Cecchi, M. Finazzi, M. Virgilio, G. Isella, and F. Bottegoni, "Probing the in-plane electron spin polarization in Ge/Si_{0.15}Ge_{0.85} multiple quantum wells", *Physical Review B* **101** (2020), 115408–6
- [18] T. Guillet, C. Zucchetti, A. Marchionni, A. Hallal, P. Biagioni, C. Vergnaud, A. Marty, H. Okuno, A. Masseboeuf, M. Finazzi, F. Ciccacci, M. Chshiev, F. Bottegoni, and M. Jamet, "Spin-orbitronics at a topological insulator-semiconductor interface", *Physical Review B* **101** (2020), 184406–7
- [19] T. Guillet, A. Marty, C. Vergnaud, M. Jamet, C. Zucchetti, G. Isella, Q. Barbedienne, H. Jaffrès, N. Reyren, J.-M. George, and A. Fert, "Large Rashba unidirectional magnetoresistance in the Fe/Ge(111) interface states", *Physical Review B* **103** (2021), 064411–5
- [20] F. Goto, A. Calloni, G. Albani, A. Picone, A. Brambilla, C. Zucchetti, F. Bottegoni, M. Finazzi, L. Duo, F. Ciccacci, and G. Bussetti, "Mapping the evolution of Bi/Ge(111) empty states: from the wetting layer to pseudo-cubic islands", *Journal of Applied Physics* **129** (2021), 155310–8
- [21] A. Marchionni, C. Zucchetti, F. Ciccacci, M. Finazzi, H. S. Funk, D. Schwarz, M. Oehme, J. Schulze, and F. Bottegoni, "Inverse spin-Hall effect in GeSn", *Applied Physics Letters* **118** (2021), 212402–5
- [22] V. Falcone, A. Ballabio, A. Barzaghi, C. Zucchetti, L. Anzi, J. Frigerio, F. Bottegoni, P. Biagioni, and G. Isella, "Ge micro-crystals photodetectors with enhanced infrared responsivity", *IEEE International Conference on Group IV Photonics GFP 2021* (2021), 176467–2
- [23] E.T. Simola, V. Kiyek, A. Ballabio, V. Schloykow, J. Frigerio, C. Zucchetti, A. De Jacovo, L. Colace, Y. Yamamoto, G. Cappellini, D. Grützmacher, D. Buca, and G. Isella, "CMOS-Compatible Bias-Tunable Dual-Band Detector Based on GeSn/Ge/Si Coupled Photodiodes", *ACS Photonics* **8** (2021), 2166–8
- [24] C. Zucchetti, A. Marchionni, M. Bollani, F. Ciccacci, M. Finazzi, and F. Bottegoni, "Electric field modulation of spin transport", *APL Materials* **10** (2022), 011102–5
- [25] V. Falcone, A. Ballabio, A. Barzaghi, C. Zucchetti, L. Anzi, F. Bottegoni, J. Frigerio, R. Sordan, P. Biagioni, and G. Isella, "Graphene/Ge microcrystal photodetectors with enhanced infrared responsivity", *APL Photonics* **7** (2022), 046106–6
- [26] D. Rocco, A. Zilli, A. Ferraro, A. Borne, V. Vinel, G. Leo, A. Lemaitre, C. Zucchetti, M. Celebrano, R. Caputo, C. De Angelis, and M. Finazzi, "Tunable second harmonic generation by an all-dielectric diffractive metasurface embedded in liquid crystals", *New Journal of Physics* **24** (2022), 045002–8
- [27] G. Albani, L. Schio, F. Goto, A. Calloni, A. Orbelli Biroli, A. Bossi, F. Melone, S. Achilli, G. Fratesi, C. Zucchetti, L. Floreano, and G. Bussetti, "Ordered assembly of non-planar vanadyl-tetraphenylporphyrins on ultra-thin iron oxide", *Physical Chemistry Chemical Physics* **28** (2022), 17077–11
- [28] C. Zucchetti, F. Scali, P. Grassi, M. Bollani, L. Anzi, G. Isella, M. Finazzi, F. Ciccacci, and F. Bottegoni, "Non-local architecture for spin current manipulation in silicon platforms", *APL Materials* **11** (2023), 021102–6

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