

# Europass Curriculum Vitae

March 31, 2022

## Personal information

Surname(s) / First name(s)

**Stefano Dal Conte**

Telephone(s)

(professional – office ITA) +39 02 23996590 (professional – lab ITA) +39 02 23996190

Email(s)

(professional) stefano.dalconte@polimi.it

Nationality(-ies)

Italian

## Professional experiences

Date	01/12/2021 →
Position	Associate professor
Name and address of the institution	Politecnico di Milano – Physics department Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)
Date	01/12/2018 – 30/11/2021
Position	Senior assistant professor (Ricercatore Tempo Determinato B)
Name and address of the institution	Politecnico di Milano – Physics department Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)
Date	30/03/2018
Position	National scientific license for associate professorship (Abilitazione scientifica nazionale per professore di II fascia, Settore FIS/01 - 02/B1)
Date	01/07/2016 – 30/11/2018
Position	Junior assistant professor (Ricercatore Tempo Determinato A)
Name and address of the institution	Politecnico di Milano – Physics department Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)
Date	01/07/2013 – 30/06/2016
Position	Postdoctoral researcher in physics
Name and address of the institution	Istituto di Fotonica e Nanotecnologie (IFN)-CNR Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)
Date	01/10/2012 – 30/06/2013
Position	Postdoctoral researcher in physics
Name and address of the institution	Politecnico di Milano – Physics department Piazza Leonardo da Vinci, 32, 20133 Milan (Italy)
Date	01/04/2011 – 30/06/2012
Position	Postdoctoral researcher in physics
Name and address of the institution	Eindhoven University of Technology PO Box 513 5600 MB Eindhoven, The Netherlands

Date 01/11/2007 – 31/10/2010  
 Position PhD Student  
 Name and address of the institution University of Pavia, Physics department  
 Via Bassi 6, 27100 Pavia, Italy

Date 09/2001 – 09/2007  
 Position Master Student  
 Name and address of the institution University of Pavia, Physics department  
 Via Bassi 6, 27100 Pavia, Italy

## Education

Date 04/03/2011  
 Title PhD  
 Topics Solid state physics: study of the ultrafast relaxation processes in high critical temperature superconductors using time resolved optical spectroscopy.  
 Title of the thesis: "Time-resolved optical spectroscopy on  $\text{Bi}_2\text{Sr}_2\text{Ca}_{0.92}\text{Y}_{0.08}\text{Cu}_2\text{O}_{8+\delta}$ "  
 Name and address of the institution Physics department, University of Pavia in collaboration with the physics department of the Catholic University of Sacred Heart (Brescia)  
 Supervisors: Prof. P. Galinetto and Prof. F. Parmigiani

Date 26/09/2007  
 Title Master degree in physics  
 Topics Electronic surface states, non-linear photoemission, lifetime and effective mass of the image potential states in graphite and layered materials  
 Title of the thesis: "Study of the image potential states in graphite by non-linear photoemission experiments"  
 Supervisor: Prof. G. Samoggia  
 Name and address of the institution Physics department, University of Pavia  
 Mark 110/110 cum laude

## Personal skills

Mother tongue(s) **Italian**

Other languages

*Self-assessment*  
*European level<sup>(\*)</sup>*

**English**

**French**

Understanding				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user
B1	Independent user	B1	Independent user	A2	Basic user	A2	Basic user	A1	Basic user

<sup>(\*)</sup> Common European Framework of Reference (CEF) level

Technical skills Time-resolved optical spectroscopy on graphene, high critical temperature superconductors and strongly correlated materials, non-linear and ultrafast optical spectroscopy, time-resolved Kerr/Faraday rotation to study the spin/valley dynamics in 2D transition metal dichalcogenides and the magnetization dynamics in antiferromagnetic materials, time-resolved and non-linear photoemission, time-resolved electron diffraction, cryogenics and ultra-high vacuum technology.

Computer skills Windows and Microsoft Office tools: Word, Power Point, Excel (good knowledge). Data analysis: Igor Pro (good knowledge). Programming: C language (basic knowledge). Data acquisition: NI Labview (basic knowledge).

## Teaching and supervision

I have been an assistant supervisor of four master students (Chiara Trovatello, Chiara Ceconello, Amedeo Carbone, Sayedhassan Zahraei), one Phd student (Chiara Trovatello) and five postdoc researchers (Zilong Wang, Patrick Altmann, Chiara Trovatello, Armando Genco, Veronica Policht). I have been supervisor of eight bachelor students. I am currently professor of physics (class: Fundamentals of experimental physics I+B - 12 CFU) for Aerospace Energy and Mechanical Engineering with responsibility of evaluation in the final examination board. I have been a teaching assistant for several courses and laboratories of physics at Politecnico di Milano. Below the list of courses per academic year.

Academic year	2020/2021
Position	Teaching of the course Fundamentals of experimental physics I+B (12 CFU) for Aerospace, Energy and Mechanical Engineering. Politecnico di Milano
Academic year	2019/2020
Position	Teaching of the course Fundamentals of experimental physics I+B (12 CFU) for Aerospace, Energy and Mechanical Engineering. Politecnico di Milano
Academic year	2019/2020
Position	Tutor of the Course Introduction to experimental research and final work (3 CFU) for Physics Engineering. Politecnico di Milano.
Academic year	2018/2019
Position	Teaching of the course Physics IIA (6 CFU) for Civil Engineering. Politecnico di Milano.
Academic year	2017/2018
Position	Teaching of the course Physics IIA (6 CFU) for Civil Engineering. Politecnico di Milano.
Academic year	2017/2018
Position	Teaching assistant of the class "Fisica Sperimentale A" for biomedical engineers (5 CFU), Prof. G. Lanzani
Academic year	2016/2017
Position	Teaching assistant of the class "Fondamenti di fisica sperimentale I+B" for mechanical engineers (12 CFU), prof. G. Cerullo and prof. D. Chrestina
Academic year	2016/2017
Position	Lecturer of a seminar for Phd students of the physics department (3 hours). Title of the seminar: "2D transition metal dichalcogenides: Electronic and optoelectronic properties"
Academic year	2016/2017
Position	Tutor of the laboratory class "Laboratori didattici" for mathematical engineers
Academic year	2016/2017
Position	Teaching assistant of the class "Fisica Sperimentale A" for biomedical engineers (5 CFU), Prof. G. Lanzani
Academic year	2015/2016
Position	Teaching assistant of the class "Fondamenti di fisica sperimentale I+B" for mechanical engineers (12 CFU), prof. G. Cerullo and prof. F. Calegari
Academic year	2015/2016
Position	Teaching assistant of the class "Fisica Sperimentale A" for biomedical engineers (5 CFU), Dr. C. Manzoni

Academic year	2014/2015
Position	Teaching assistant of the class "Fondamenti di fisica sperimentale I+B" for mechanical engineers (12 CFU), prof. G. Cerullo and prof. F. Calegari
Academic year	2013/2014
Position	Teaching assistant of the class "Fondamenti di fisica sperimentale I+B" for mechanical engineers (12 CFU), prof. G. Cerullo and prof. F. Calegari
Academic year	2012/2013
Position	Teaching assistant of the class "Fondamenti di fisica sperimentale I+B" for mechanical engineers (12 CFU), prof. G. Cerullo and prof. F. Calegari

## Research projects and Grants

Participant	"Futuro in Ricerca" grant No. RBFR12SW0J founded by MIUR
Participant	Graphene Flagship, founded by EU, (contract No. CNECT-ICT-604391)
Participant	GO FAST project, founded by EU, Seventh Framework Programme (FP7 2007-2013), Grant No. 280555
Grant	National grant FFABR, "Fondo per il finanziamento delle attività base di ricerca" (3000 euro)
Responsabile di unità	Progetto Prin bando 2017- Prot. 20172H2SC4 (Engineering coherent transport of atoms and electrons in layered structures (CEnTraL))

## Conferences

Poster contribution	
Date	28/06/2021–8/7/2021
Name	LEES 2021
Place	Online event
Title	"Interlayer charge transfer and spin/valley dynamics in TMD heterostructures"
Oral contribution	
Date	30/09/2019–4/10/2019
Name	FISMAT 2019
Place	Catania, Italy
Title	"Charge and spin/valley dynamics in 2D heterostructures"
Invited oral contribution	
Date	2/09/2019–6/09/2019
Name	NGSCES 2019
Place	Pescara, Italy
Title	"Time-resolved dynamics of the electron-boson coupling in superconductors"
Poster contribution	
Date	23/06/2019–27/06/2019
Name	Cleo Europe-EQEC 2019
Place	Munich, Germany
Title	"Ultrafast charge transfer and valley dynamics in WSe <sub>2</sub> /MoSe <sub>2</sub> heterostructure"
Oral contribution	
Date	23/06/2019–27/06/2019

Name	Cleo Europe-EQEC 2019
Place	Munich, Germany
Title	"Exciton and trion dynamics in gated single layer TMDs"
Oral contribution	
Date	17/06/2019–20/06/2019
Name	PIERS 2019
Place	Rome, Italy
Title	"Ultrafast dynamics in 2D transition metal dichalcogenides and related heterostructures"
Oral contribution	
Date	17/06/2019–20/06/2019
Name	PIERS 2019
Place	Rome, Italy
Title	"Optical pump-probe spectroscopy: a tool to study exciton and phonon dynamics in 2D Transition Metal Dichalcogenides (TMDs)"
Invited oral contribution	
Date	5/06/2019–6/06/2019
Name	2D Med
Place	Valencia, Spain
Title	"Ultrafast dynamics in 2D transition metal dichalcogenides and related heterostructures"
Invited oral contribution	
Date	19/05/2019–24/05/2019
Name	7th workshop on 2D materials.
Place	Elche, Spain
Title	"Ultrafast dynamics in 2D transition metal dichalcogenides and related heterostructures"
Invited seminar	
Date	18/04/2019
Name	
Place	Elettra synchrotron (Trieste-Italy)
Title	"Ultrafast optical studies of single layer transition metal dichalcogenides and related heterostructures"
Invited oral contributions	
Date	27/08/2018–31/08/2018
Name	Progresses in NonEquilibrium Green's Functions VII
Place	Frascati, Italy
Title	"Non-equilibrium physics of single layer transition metal dichalcogenides and related heterostructures"
Invited oral contributions	
Date	01/10/2017–05/10/2017
Name	FISMAT 2017: Italian national conference on condensed matter physics
Place	Trieste, Italy
Title	"Ultrafast exciton and valley dynamics in two-dimensional materials"
Invited oral contributions	
Date	25/06/2017–30/06/2017
Name	OSI 12: The International Conference on Optics of Surfaces and Interfaces
Place	Dublin, Ireland
Title	"Ultrafast photophysics of two-dimensional materials"
Invited oral contributions	

Date	26/09/2016–30/09/2016
Name	Conferenza della Società Italiana di Fisica (SIF)
Place	Padova, Italy
Title	"Ultrafast carrier and valley dynamics in two dimensional semiconductors"
Invited oral contributions	
Date	06/07/2015–09/07/2015
Name	PIERS 2015: Progress in electromagnetics research symposium
Place	Prague, Czech Republic
Title	"Valley dynamics in monolayer MoS <sub>2</sub> probed by time-resolved Faraday rotation"
Invited oral contributions	
Date	09/08/2015–13/08/2015
Name	Spintronics VIII - SPIE
Place	San Diego, USA
Title	"Intervalley scattering in monolayer MoS <sub>2</sub> probed by non-equilibrium optical techniques"
Invited seminars	
Date	06/06/2017–08/06/2017
Name	International School of Optical Characterization of Photonic Structures
Place	University of Pisa, Italy
Title	"Ultrafast optical characterization of 2D materials"
Invited seminars	
Date	23/11/2017
Place	Technical University of Dortmund, Germany
Title	"Ultrafast exciton and valley dynamics in two-dimensional materials"
Oral contributions	
Date	24/06/2018–29/06/2018
Name	LEES 2018
Place	Portonovo, Italy
Title	"Time-domain observation of the coupling between charge carriers and bosonic fluctuations in high temperature superconductors"
Oral contributions	
Date	29/08/2017–01/09/2017
Name	Flatlands 2017
Place	Lausanne, Switzerland
Title	"Direct measurement of intravalley spin relaxation process in a single layer of WS <sub>2</sub> "
Oral contributions	
Date	17/07/2016–22/07/2016
Name	International Conference on Ultrafast Phenomena
Place	Santa Fe, USA
Title	"Excitation and coherent control of antiferromagnetic spin waves with sub-20-fs optical pulses"
Oral contributions	
Date	17/07/2016–22/07/2016
Name	International Conference on Ultrafast Phenomena
Place	Santa Fe, USA
Title	"Ultrafast valley depolarization dynamics in monolayer MoS <sub>2</sub> "
Oral contributions	

Date	21/06/2015–25/06/2015
Name	Cleo Europe-EQEC 2015
Place	Munich, Germany
Title	"Valley dynamics in monolayer MoS <sub>2</sub> probed by time-resolved Faraday rotation"
Oral contributions	
Date	10/03/2015–13/03/2015
Name	Graphene 2015
Place	Bilbao, Spain
Title	"Valley and spin dynamics in monolayer MoS <sub>2</sub> "
Oral contributions	
Date	09/09/2013–13/09/2013
Name	FISMAT 2013: Italian national conference on condensed matter physics
Place	Milano, Italy
Title	"Tracking the dynamics of the pairing glue in a cuprate superconductor with ultrashort laser pulses"
Oral contributions	
Date	22/07/2012–27/07/2012
Name	LEES 2012: Low energy electrodynamics in solids
Place	Napa, USA
Title	"Disentangling the electronic and phononic glue in a high-T <sub>c</sub> superconductor"
Poster contributions	
Date	14/02/2016–14/02/2016
Name	Gordon Conference "Ultrafast phenomena in cooperative systems"
Place	Lucca, Italy
Title	"Snapshots of the retarded interaction of charge carriers with ultrafast fluctuations in cuprates"
Poster contributions	
Date	19/10/2015–23/10/2015
Name	Ultrafast Magnetism Conference, UMC 2015
Place	Nijmegen, The Netherlands
Title	"Ultrafast valley relaxation dynamics in monolayer MoS <sub>2</sub> probed by non-equilibrium optical techniques".
Poster contributions	
Date	07/07/2014–11/07/2014
Name	UP2014: 19 <sup>th</sup> international conference on ultrafast phenomena
Place	Okinawa, Japan
Title	"Ultrafast carriers dynamics in silicon: a joint experimental and theoretical study"
Poster contributions	
Date	07/07/2014–11/07/2014
Name	UP2014: 19 <sup>th</sup> international conference on ultrafast phenomena
Place	Okinawa, Japan
Title	"Ultrafast dynamics in epitaxial silicene on Ag(111)"
Poster contributions	
Date	07/07/2014–11/07/2014
Name	UP2014: 19 <sup>th</sup> international conference on ultrafast phenomena
Place	Okinawa, Japan
Title	"Snapshots of the retarded interaction of charge carriers with ultrafast fluctuations in cuprates"

Poster contributions	
Date	01/07/2013–05/07/2013
Name	NGSCES 2013: The new generation in strongly correlated electron systems
Place	Sestri Levante, Italy
Title	"Tracking the dynamics of the pairing glue in a cuprate superconductor with ultrashort laser pulses"
Poster contributions	
Date	09/09/2013–13/09/2013
Name	FISMAT 2013: Italian national conference on condensed matter physics
Place	Milano, Italy
Title	"Electron-phonon coupling in MgB <sub>2</sub> superconductor: a comparative study by photoemission and time resolved optical spectroscopy"
Poster contributions	
Date	09/09/2013–13/09/2013
Name	FISMAT 2013: Italian national conference on condensed matter physics
Place	Milano, Italy
Title	"Transient optical response of a metal-dielectric distributed Bragg reflector"
Poster contributions	
Date	14/10/2013–18/10/2013
Name	Conference on ultrafast dynamics of correlated materials
Place	Trieste, Italy
Title	"Tracking the dynamics of the pairing glue in a cuprate superconductor with ultrashort laser pulses"
Poster contributions	
Date	19/02/2012–22/02/2012
Name	BANFF meeting on structural dynamics: ultrafast dynamics with X rays and electrons
Place	Banff, Canada
Title	"Radio-frequency electron bunches compression for femtosecond diffraction experiments"
Poster contributions	
Date	05/07/2010–10/07/2010
Name	LEES 2010: Low energy electrodynamics in solids
Place	Les Diablerets, Switzerland
Title	"Exploring the electron-boson coupling in cuprates by time and frequency resolved optical spectroscopy"
Poster contributions	
Date	30/08/2009–04/09/2009
Name	ECOSS 26: European conference of surface science
Place	Parma, Italy
Title	"Study of the electronic structure of calcium-intercalated graphite superconductor"
Poster contributions	
Date	19/03/2008–21/03/2008
Name	SATT 14: Italian national conference on superconductivity
Place	Parma, Italy
Title	Study of the electronic structure of calcium-intercalated graphite superconductor



## Scientific Background

During the phd, my research activity has been dedicated to the study of non-equilibrium dynamics of strongly correlated electronic materials. In these systems the interplay of different degrees of freedom like phonons, orbital order and spin gives rise to non conventional properties like the high critical temperature superconductivity, giant magnetoresistance, antiferromagnetism and metal-insulator transition. In particular, one of the most debated aspect regarding these systems, is to understand the nature of the bosonic excitations mediating the Cooper pair formation in cuprates superconductors. The approach is based on pump-probe optical spectroscopy. In the experiment, the carriers are photo-excited by a femtosecond pump pulse while the transient change of the optical response on a broad energy range is measured with a second delayed optical pulse. The combination of high temporal resolution and broad spectral coverage has allowed to disentangle electronic and phononic contributions to the electron-boson coupling function due to the different time relaxation and spectral response. This work has been entirely done during the PhD and it has been published on Science journal.

During the postdoc period, I have focused my research on the generation of few optical cycle laser pulses and their application to time resolved optical spectroscopy. In particular I have extended the study of the photoexcited carriers relaxation dynamics in cuprates superconductors to a temporal scale never explored before in these materials (i.e.  $<20$  fs). In this experimental study, published on Nature Physics journal, the relaxation dynamics between photexcited carriers and short range antiferromagnetic interaction, responsible of the superconductivity, have been observed directly.

Another research interest is the study of the non-equilibrium optical properties of low dimensional materials like graphene and 2D transition metal dichalcogenides (TMDs). In particular, during the last years research period, I have developed a transient Faraday/Kerr rotation setup to measure the spin and valley dynamics in layered semiconductors. These measurements has allowed to clarify the main mechanism leading to fast valley depolarization dynamics in TMDs. The study of the exciton and the charge dynamics in TMDs and TMD based heterobilayers, is another topic of my work. Due to the strong quantum confinement effect, the optical properties of TMDs is dominated by excitonic effects. Thanks to a pump-probe optical microscopy setup, developed by me and my colleagues, it has been possible to study many body processes, like transient bandgap renormalization, which dominate the non-equilibrium optical response of TMDs.

## Major collaborations

I have established a number of collaborations with national and international research groups, active in the field of ultrafast spectroscopy and condensed matter. Below the list of the main collaborators:

Prof. Andrea Ferrari, University of Cambridge and Cambridge Graphene Center. Ultrafast optical spectroscopy on graphene and 2D transition metal dichalcogenides.

Prof. Marco Finazzi, Politecnico di Milano. Spin and valley relaxation dynamics in 2D transition metal dichalcogenides.

Prof. Deji Akinwande, The University of Texas, Austin. Charge dynamics in 2D heterostructures and black phosphorus.

Prof. Costantino de Angelis, University of Brescia. Nonlinear optical response in metal-dielectric Bragg filters.

Prof. Alexey Kimel, Radboud university. Ultrafast spin dynamics in antiferromagnets.

Prof. Claudio Giannetti, Catholic University of Sacred Heart (Brescia). Study of the photoexcited carriers dynamics in non conventional superconductors and strongly correlated materials.

Prof. Daniele Fausti, University of Trieste. Non-equilibrium optical response of cuprate parent compounds.

Prof. Jim Shuck and Prof. Xiaoyang Zhu, Columbia University. Non-linear and ultrafast optical properties of TMD and related heterostructures.

Prof. Andreas Knorr, TU Berlin. Theory of ultrafast processes in 2D semiconductors.

Dr. Davide Bossini and Prof. Mirko Cinchetti, TU Dortmund. Spin dynamics in magnetic semiconductors.

Prof. Tobias Brixner, University of Wuerzburg. 2D coherent spectroscopy on transition metal dichalcogenides

I am co-author of 45 peer-reviewed publications on international journals: 1 Science (as first author), 2 Nature Physics (one as first and corresponding author), 1 Nature Nanotechnology, 6 Nature Communications (one as last and corresponding author), 2 Physical Review Letters). The report of citations is the following (Scopus, updated to July 2021): sum of the time cited: 1329, h-index: 20 (without self citations).

## Publications

- [1] D. Li, C. Trovatiello, S. Dal Conte, M. Nuß, G. Soavi, G. Wang, A. Ferrari, G. Cerullo, and T. Brixner, "Exciton-phonon coupling strength in single-layer mose2 at room temperature," *Nature Communications* **12** (2021), [10.1038/s41467-021-20895-0](https://doi.org/10.1038/s41467-021-20895-0).
- [2] L. Ghirardini, E. Pogna, G. Soavi, A. Tomadin, P. Biagioni, S. Dal Conte, S. Mignuzzi, D. De Fazio, T. Taniguchi, K. Watanabe, L. Duò, M. Finazzi, M. Polini, A. Ferrari, G. Cerullo, and M. Celebrano, "Tunable broadband light emission from graphene," *2D Materials* **8** (2021), [10.1088/2053-1583/abf08d](https://doi.org/10.1088/2053-1583/abf08d).
- [3] Z. Wang, P. Altmann, C. Gadermaier, Y. Yang, W. Li, L. Ghirardini, C. Trovatiello, M. Finazzi, L. Duò, M. Celebrano, R. Long, D. Akinwande, O. Prezhd, G. Cerullo, and S. Dal Conte, "Phonon-mediated interlayer charge separation and recombination in a mose2/wse2heterostructure," *Nano Letters* **21**, 2165 (2021).
- [4] V. Policht, M. Russo, F. Liu, C. Trovatiello, M. Maiuri, Y. Bai, X. Zhu, S. Dal Conte, and G. Cerullo, "Dissecting interlayer hole and electron transfer in transition metal dichalcogenide heterostructures via two-dimensional electronic spectroscopy," *Nano Letters* (2021), [10.1021/acs.nanolett.1c01098](https://doi.org/10.1021/acs.nanolett.1c01098).
- [5] C. Trovatiello, A. Marini, X. Xu, C. Lee, F. Liu, N. Curreli, C. Manzoni, S. Dal Conte, K. Yao, A. Ciattoni, J. Hone, X. Zhu, P. Schuck, and G. Cerullo, "Optical parametric amplification by monolayer transition metal dichalcogenides," *Nature Photonics* **15**, 6 (2021).
- [6] A. Ross, G. Paternò, S. Dal Conte, F. Scotognella, and E. Cinquanta, "Anisotropic complex refractive indices of atomically thin materials: Determination of the optical constants of few-layer black phosphorus," *Materials* **13**, 1 (2020).
- [7] C. Trovatiello, F. Katsch, N. Borys, M. Selig, K. Yao, R. Borrego-Varillas, F. Scotognella, I. Kriegel, A. Yan, A. Zettl, P. Schuck, A. Knorr, G. Cerullo, and S. Conte, "The ultrafast onset of exciton formation in 2d semiconductors," *Nature Communications* **11** (2020), [10.1038/s41467-020-18835-5](https://doi.org/10.1038/s41467-020-18835-5).
- [8] C. Sayers, H. Hedayat, A. Ceraso, F. Museur, M. Cattelan, L. Hart, L. Farrar, S. Dal Conte, G. Cerullo, C. Dallera, E. Da Como, and E. Carpena, "Coherent phonons and the interplay between charge density wave and mott phases in 1t-ta-se2," *Physical Review B* **102** (2020), [10.1103/PhysRevB.102.161105](https://doi.org/10.1103/PhysRevB.102.161105).
- [9] D. Bossini, S. Dal Conte, G. Cerullo, O. Gomonay, R. Pisarev, M. Borovsak, D. Mihailovic, J. Sinova, J. Mentink, T. Rasing, and A. Kimel, "Laser-driven quantum magnonics and terahertz dynamics of the order parameter in antiferromagnets," *Physical Review B* **100** (2019), [10.1103/PhysRevB.100.024428](https://doi.org/10.1103/PhysRevB.100.024428).
- [10] S. Dal Conte, C. Trovatiello, C. Gadermaier, and G. Cerullo, "Ultrafast photophysics of 2d semiconductors and related heterostructures," *Trends in Chemistry* (2019), [10.1016/j.trechm.2019.07.007](https://doi.org/10.1016/j.trechm.2019.07.007).
- [11] Z. Wang, A. Molina-Sánchez, P. Altmann, D. Sangalli, D. De Fazio, G. Soavi, U. Sassi, F. Bottegoni, F. Ciccacci, M. Finazzi, L. Wirtz, A. Ferrari, A. Marini, G. Cerullo, and S. Dal Conte, "Intravalley spin-flip relaxation dynamics in single-layer ws2," *Nano Letters* **18**, 6882 (2018).
- [12] G. Soavi, G. Wang, H. Rostami, D. Purdie, D. de Fazio, T. Ma, B. Luo, J. Wang, A. Ott, D. Yoon, S. Bourelle, J. Muench, I. Goykhman, S. Dal Conte, M. Celebrano, A. Tomadin, M. Polini, G. Cerullo, and A. Ferrari, "Broadband, electrically tunable third-harmonic generation in graphene," *Nature Nanotechnology* **13**, 806 (2018).
- [13] Z. Nie, C. Trovatiello, E. Pogna, S. Dal Conte, P. Miranda, E. Kelleher, C. Zhu, I. Turcu, Y. Xu, K. Liu, G. Cerullo, and F. Wang, "Broadband nonlinear optical response of monolayer mose2 under ultrafast excitation," *Applied Physics Letters* **112** (2018), [10.1063/1.5010060](https://doi.org/10.1063/1.5010060).
- [14] S. Peli, S. Dal Conte, R. Comin, N. Nembrini, A. Ronchi, P. Abrami, F. Banfi, G. Ferrini, D. Brida, S. Lupi, M. Fabrizio, A. Damascelli, M. Capone, G. Cerullo, and C. Giannetti, "Mottness at finite doping and charge instabilities in cuprates," *Nature Physics* **13**, 806 (2017).
- [15] 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 a large length scale in bulk germanium," *Physical Review Letters* **118** (2017), [10.1103/PhysRevLett.118.167402](https://doi.org/10.1103/PhysRevLett.118.167402).
- [16] D. Vella, D. Ovchinnikov, D. Viola, D. Dumcenco, Y. C. Kung, E. A. A. Pogna, S. D. Conte, V. Vega-Mayoral, T. Borzda, M. Prijatelj, D. Mihailovic, A. Kis, G. Cerullo, and C. Gadermaier, "Field-induced charge separation dynamics in monolayer mos 2," *2D Materials* **4**, 035017 (2017).
- [17] M. Montagnese, S. Pagliara, G. Galimberti, S. Dal Conte, G. Ferrini, P. Van Loosdrecht, and F. Parmigiani, "Optically induced effective mass renormalization: The case of graphite image potential states," *Scientific Reports* **6** (2016), [10.1038/srep35318](https://doi.org/10.1038/srep35318).
- [18] S. Pietralunga, C. Manzoni, E. Carpena, D. Bugini, S. Dal Conte, H. Hedayat, G. Soavi, M. Vahid, T. Virgili, M. Zani, C. Dallera, R. Sordan, A. Tagliaferri, and G. Cerullo, "Advanced spectroscopies of graphene and 2d materials," *International Conference on Transparent Optical Networks 2016-August* (2016), [10.1109/ICTON.2016.7550392](https://doi.org/10.1109/ICTON.2016.7550392).
- [19] E. Pogna, S. Dal Conte, G. Soavi, V. Kravets, Y.-J. Kim, S. Longhi, A. Grigorenko, G. Cerullo, and G. Della Valle, "Ultrafast spectroscopy of graphene-protected thin copper films," *ACS Photonics* **3**, 1508 (2016).
- [20] V. G. Sala, S. Dal Conte, T. A. Miller, D. Viola, E. Luppi, V. Vénard, G. Cerullo, and S. Wall, "Resonant optical control of the structural distortions that drive ultrafast demagnetization in cr2o3," *Phys. Rev. B* **94**, 014430 (2016).
- [21] D. Sangalli, S. Dal Conte, C. Manzoni, G. Cerullo, and A. Marini, "Nonequilibrium optical properties in semiconductors from first principles: A combined theoretical and experimental study of bulk silicon," *Phys. Rev. B* **93**, 195205 (2016).

- [22] V. Vega-Mayoral, D. Vella, T. Borzda, M. Prijatelj, I. Tempra, E. A. A. Pogna, S. Dal Conte, P. Topolovsek, N. Vujicic, G. Cerullo, D. Mihailovic, and C. Gadermaier, "Exciton and charge carrier dynamics in few-layer  $\text{ws}_2$ ," *Nanoscale* **8**, 5428 (2016).
- [23] G. Soavi, S. Dal Conte, C. Manzoni, D. Viola, A. Narita, Y. Hu, X. Feng, U. Hohenester, E. Molinari, D. Prezzi, K. Mullen, and G. Cerullo, "Exciton-exciton annihilation and biexciton stimulated emission in graphene nanoribbons," *Nature Communications* **7** (2016), 10.1038/ncomms11010.
- [24] D. Bossini, S. Dal Conte, Y. Hashimoto, A. Secchi, R. Pisarev, T. Rasing, G. Cerullo, and A. Kimel, "Macrospin dynamics in antiferromagnets triggered by sub-20 femtosecond injection of nanomagnons," *Nature Communications* **7** (2016), 10.1038/ncomms10645.
- [25] E. A. A. Pogna, M. Marsili, D. De Fazio, S. Dal Conte, C. Manzoni, D. Sangalli, D. Yoon, A. Lombardo, A. Ferrari, G. Marini, A. Cerullo, and D. Prezzi, "Photo-induced bandgap renormalization governs the ultrafast response of single-layer  $\text{mos}_2$ ," *ACS Nano* **10**, 1182 (2016).
- [26] S. Dal Conte, F. Bottegoni, E. A. A. Pogna, D. De Fazio, S. Ambrogio, I. Bargigia, C. D'Andrea, A. Lombardo, M. Bruna, F. Ciccacci, A. C. Ferrari, G. Cerullo, and M. Finazzi, "Ultrafast valley relaxation dynamics in monolayer  $\text{mos}_2$  probed by nonequilibrium optical techniques," *Phys. Rev. B* **92**, 235425 (2015).
- [27] E. Cinquanta, G. Fratesi, S. Dal Conte, C. Grazianetti, F. Scotognella, S. Stagira, C. Vozzi, G. Onida, and A. Molle, "Optical response and ultrafast carrier dynamics of the silicene-silver interface," *Phys. Rev. B* **92**, 165427 (2015).
- [28] S. Dal Conte, F. Bottegoni, E. Pogna, D. De Fazio, S. Ambrogio, S. Bargigia, C. D'Andrea, A. Lombardo, M. Bruna, F. Ciccacci, A. Ferrari, G. Cerullo, and M. Finazzi, "Intervalley scattering in monolayer  $\text{mos}_2$  probed by non-equilibrium optical techniques," *Proceedings of SPIE - The International Society for Optical Engineering* **9551** (2015), 10.1117/12.2186692.
- [29] S. Dal Conte, L. Vidmar, D. Golez, M. Mierzejewski, G. Soavi, S. Peli, F. Banfi, G. Ferrini, R. Comin, B. Ludbrook, L. Chauviere, N. Zhigadlo, H. Eisaki, M. Greven, S. Lupi, A. Damascelli, D. Brida, M. Capone, J. Bonca, G. Cerullo, and C. Giannetti, "Snapshots of the retarded interaction of charge carriers with ultrafast fluctuations in cuprates," *Nature Physics* **11**, 421 (2015).
- [30] Y. Ben-Shahar, F. Scotognella, N. Waiskopf, I. Kriegel, S. Dal Conte, G. Cerullo, and U. Banin, "Effect of surface coating on the photocatalytic function of hybrid  $\text{cds}$ - $\text{au}$  nanorods," *Small* **11**, 462 (2015).
- [31] F. Cilento, S. Dal Conte, G. Coslovich, S. Peli, N. Nembrini, S. Mor, F. Banfi, H. Ferrini, G. Eisaki, M. K. Chan, C. J. Dorow, M. J. Veit, M. Greven, D. van der Marel, R. Comin, A. Damascelli, L. Rettig, B. U., M. Capone, C. Giannetti, and F. Parmigiani, "Photo-enhanced antinodal conductivity in the pseudogap state of high- $t_c$  cuprates," *Nat. Commun.* **5**, 4353 (2014).
- [32] S. Dal Conte, M. Conforti, D. Petti, E. Albisetti, S. Longhi, R. Bertacco, C. De Angelis, G. Cerullo, and G. Della Valle, "Disentangling electrons and lattice nonlinear optical response in metal-dielectric bragg filters," *Phys. Rev. B* **89**, 125122 (2014).
- [33] S. Dal Conte, D. Sangalli, A. Marini, G. Cerullo, and C. Manzoni, "Ultrafast carriers dynamics in silicon: a joint experimental and theoretical study," in *19th International Conference on Ultrafast Phenomena* (Optical Society of America, 2014).
- [34] E. Cinquanta, S. D. Conte, D. Chiappe, C. Grazianetti, M. Fanciulli, A. Molle, G. Cerullo, S. Stagira, F. Scotognella, and C. Vozzi, "Ultrafast dynamics in epitaxial silicene on  $\text{ag}(111)$ ," in *19th International Conference on Ultrafast Phenomena* (Optical Society of America, 2014).
- [35] F. Novelli, G. De Filippis, V. Cataudella, M. Esposito, I. Vergara, F. Cilento, E. Sindici, A. Amaricci, C. Giannetti, D. Prabhakaran, S. Wall, A. Perucchi, S. Dal Conte, G. Cerullo, M. Capone, A. Mishchenko, M. Gruninger, N. Nagaosa, F. Parmigiani, and D. Fausti, "Witnessing the formation and relaxation of dressed quasi-particles in a strongly correlated electron system," *Nature Communications* **5** (2014), 10.1038/ncomms6112.
- [36] P. Pasmans, G. van den Ham, S. Dal Conte, S. van der Geer, and O. Luiten, "Microwave  $\text{tm}_{010}$  cavities as versatile 4d electron optical elements," *Ultramicroscopy* **127**, 19 (2013).
- [37] G. Coslovich, C. Giannetti, F. Cilento, S. Dal Conte, T. Abebaw, D. Bossini, G. Ferrini, H. Eisaki, M. Greven, A. Damascelli, and F. Parmigiani, "Competition between the pseudogap and superconducting states of  $\text{bi}_2\text{sr}_2\text{ca}_{0.92}\text{y}_{0.08}\text{cu}_2\text{o}_{8+\delta}$  single crystals revealed by ultrafast broadband optical reflectivity," *Phys. Rev. Lett.* **110**, 107003 (2013).
- [38] S. Pagliara, M. Montagnese, S. Dal Conte, G. Galimberti, G. Ferrini, and F. Parmigiani, "Insight on the interaction between image potential state and  $\pi$  bands in graphite," *Phys. Rev. B* **87**, 045427 (2013).
- [39] S. Dal Conte, C. Giannetti, G. Coslovich, F. Cilento, D. Bossini, T. Abebaw, F. Banfi, G. Ferrini, H. Eisaki, M. Greven, A. Damascelli, D. Van Der Marel, and F. Parmigiani, "Disentangling the electronic and phononic glue in a high- $t_c$  superconductor," *Science* **335**, 1600 (2012).
- [40] F. Banfi, V. Juvé, D. Nardi, S. Dal Conte, C. Giannetti, G. Ferrini, N. Del Fatti, and F. Vallée, "Temperature dependence of the thermal boundary resistivity of glass-embedded metal nanoparticles," *Applied Physics Letters* **100** (2012), 10.1063/1.3673559.
- [41] G. Galimberti, S. Pagliara, S. Ponzoni, S. Dal Conte, F. Cilento, G. Ferrini, S. Hofmann, M. Arshad, C. Cepek, and F. Parmigiani, "The photoinduced charge transfer mechanism in aligned and unaligned carbon nanotubes," *Carbon* **49**, 5246 (2011).
- [42] C. Giannetti, F. Cilento, S. Dal Conte, G. Coslovich, G. Ferrini, H. Molegraaf, M. Raichle, R. Liang, H. Eisaki, M. Greven, A. Damascelli, D. Van Der Marel, and F. Parmigiani, "Revealing the high-energy electronic excitations underlying the onset of high-temperature superconductivity in cuprates," *Nature Communications* **2** (2011), 10.1038/ncomms1354.

- [43] G. Coslovich, C. Giannetti, F. Cilento, S. Dal Conte, G. Ferrini, P. Galinetto, M. Greven, H. Eisaki, M. Raichle, R. Liang, A. Damascelli, and F. Parmigiani, "Evidence for a photoinduced nonthermal superconducting-to-normal-state phase transition in overdoped  $\text{Bi}_2\text{Sr}_2\text{Ca}_{0.92}\text{Y}_{0.08}\text{Cu}_2\text{O}_{8+\delta}$ ," [Phys. Rev. B \*\*83\*\*, 064519 \(2011\)](#).
- [44] F. Cilento, C. Giannetti, G. Ferrini, S. Dal Conte, T. Sala, G. Coslovich, M. Rini, A. Cavalleri, and F. Parmigiani, "Ultrafast insulator-to-metal phase transition as a switch to measure the spectrogram of a supercontinuum light pulse," [Applied Physics Letters \*\*96\*\* \(2010\), 10.1063/1.3291105](#).
- [45] E. Pedersoli, C. Greaves, W. Wan, C. Coleman-Smith, H. Padmore, S. Pagliara, A. Cartella, F. Lamarca, G. Ferrini, G. Galimberti, M. Montagnese, S. Dal Conte, and F. Parmigiani, "Surface and bulk contribution to  $\text{Cu}(111)$  quantum efficiency," [Applied Physics Letters \*\*93\*\* \(2008\), 10.1063/1.3021069](#).