

Marc Van den Bossche

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Education

- 2020–2021 **Fundamental Mathematics Masters**, Sorbone Université, Paris, Homotopy theory and Algebraic topology.
- 2019–2020 **Theoretical Physics ICFP Masters**, École Normale Supérieure, Paris.
- 2017–2021 **École Normale Supérieure, Paris**, Physics major, Mathematics minor.
- 2015–2017 **CPGE PCSI, PC***, PCSI at Lycée Déodat de Séverac (Toulouse) and PC* at Lycée Pierre de Fermat (Toulouse), two-year preparation for top French schools, Major in Mathematics, Physics and Chemistry.

Research experience

- 2021 – 2024 **Philosophy Doctorate**, with Dr G. LESUR and Dr G. DUBUS at Institut de Planétologie et d'Astrophysique de Grenoble, (IPAG).
Global models of accretion disc in compact binaries.
- May 2021 – **Research Intern**, with Dr G. LESUR at Institut de Planétologie et d'Astrophysique de Grenoble,
July 2021 (IPAG).
Analytical and numerical studies of Spiral waves in accretion discs of close binary systems.
- April 2020 – **Research Intern**, with Pr S. BALBUS at Oxford Astrophysics.
July 2020 Analytical and numerical studies of *Fluctuations of relativistic thin TDE discs.*
- Feb 2019 – **Research Intern**, with Pr N. MURRAY at the Canadian Institute for Theoretical Astrophysics,
July 2019 (CITA).
Numerical models to study [CII] line emission at the epoch of reionisation using FIRE galaxy formation simulations.
- June 2018 – **Research Intern**, with Dr G. HÉTET at the Laboratoire de Physique de l'ENS, (LPENS, fka
July 2018 LPA).
Experimental work on Rotating diamonds with embedded spins in a magnetic field.
- July 2017 **Research Intern**, with Dr S. GLEYZES at the Laboratoire Kastler Brossel, Collège de France,
(LKB).
In the Cavity Quantum Electrodynamics group.

Obtained computing time

- 2023 **375,000 hGPU**, shared across AMD Mi250 and Nvidia V100, Adastra at CINES and Jean Zay at IDRIS, eDARI A14.
- 2022 **300,000 hGPU**, on AMD Mi250, Adastra at CINES, "Grand challenge".
- 2022 **295,000 hGPU**, on Nvidia V100, Jean Zay at IDRIS, eDARI A12.

Peer-reviewed publications

M. Van den Bossche, G. Lesur, G. Dubus, Spiral wave driven accretion in quiescent dwarf novæ, A&A, 677, A10 (2023), DOI: 10.1051/0004-6361/202346090, arXiv: 2304.13773

G. R. J. Lesur, S. Baghdadi, G. Wafflard-Fernandez, J. Mouxion, C. M. T. Robert, **M. Van den Bossche**, IDEFIX: a versatile performance-portable Godunov code for astrophysical flows, A&A, 677, A9 (2023), DOI: 10.1051/0004-6361/202346005, arXiv: 2304.13746

P. Huillery, T. Delord, L. Nicolas, **M. Van den Bossche**, M. Perdriat, and G. Hétet, Spin-mechanics with levitating ferromagnetic particles, Phys. Rev. B 101, 134415 (2020), DOI: 10.1103/PhysRevB.101.134415,

Projects

- 2018 – 2019 **Library Based Project**, with Pr N. KAISER at the *Laboratoire de Physique de l'ENS*, (LPENS).
Bibliography project on *The ϕ -CDM Model: A light or massless scalar field coupling to matter and cold dark matter*, its development, and consequences on cosmological models.
- 2018 – 2019 **Numerical project**, with Dr B. RÉGALDO-SAINT BLANCARD, LPENS.
Simple star stability model for 1D Super-Novæ from Lane-Emden equation
- 2017 **Personnal numerical project**.
Solving the Rubick's Cube with an Entropy minimising approach
- 2016 – 2017 **TIPE**, with Dr J-C HANACHI at *Lycée Pierre de Fermat*.
Bibliography project, with modelling and experiment work for competitive exams on *Optimisation of a C-Cl parameter in the Hückel molecular orbital model*.

Conferences, workshops and summer schools

- Sept 2023 **Journées du PNHE**, Institut d'Astrophysique de Paris, France, short **contributed talk**.
- July 2023 **Idefix User Days**, Grenoble, France, **talk** and part of **organisation commitee**.
- June 2023 **First Vasto Accretion Meeting**, Vasto, Italy, **contributed talk**.
- May 2023 **Microquasar workshop**, Sissi, Greece, **contributed poster**.
- June 2022 **Journées de la SF2A**, Besançon, France.
- Summer 2019 **LION : Modern Physics at all scales**, *summer school*, Universiteit Leiden, Netherlands.

Teaching and outreach

- 2023 **Masters Intern co-supervision**, together with G.LESUR, supervision of a masters intern on *Modelling viscous-driven outbursts in dwarf novæ discs* based on results obtained during the PhD, IPAG.
- 2022-2023 **Physics teaching**, *96h of mechanics courses: exercise and experiment sessions*, Université Grenoble Alpes.
- 2023 **Computed science teaching**, *32h of Python courses: exercise and project sessions*, Université Grenoble Alpes.
- 2021 & 2023 **Outreach**, *Supervision of two 9th grade interns (French "stage de 3^{ème}")*, *How can we measure the mass of a supermassive black hole?*, IPAG.
- 2018-2019 **Weekly event organiser**, Organisation of weekly Researcher-Student meetings, with catering: "Le Chocolat des Physiciens", ENS.

Competences

Scientific	Idefix (Finite-volume GPU code, written using Kokkos) Paraview, Supercomputer and cloud computing (HPC)
Programming	C, C++, Python, MPI, openMP, bash, git, pytest
Web	HTML, CSS, PHP, SQL
Misc.	GIMP, Inkscape, L ^A T _E X, linux server administration

Languages

French: Native, **English:** C2 (CAE), **German:** C1 (Abitur), **Spanish:** A2, **Arabic (MSA):** A2, **Italian:** A1

Interests

Tennis, HEMA, Drums, Guitar, Cello, Theatre, Linux server deployment, programmation, SF and Fantasy literature, writing, TTRPG