Nicolás Pablo **Müller**

Postdoc - Fluid Dynamics

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TODO: Improve this text, maybe better description of academic experience (CFD, intermittency, parallel computing). I currently have a postdoc position at the Observatoire de la Côte d'Azur. My scientific work is focused on theoretical and numerical studies of superfluid turbulence, mainly based on the Gross-Pitaevskii equation. I'm interested in the properties of two- and three-dimensional turbulent flows, and the differences and similarities between classical and quantum turbulence. Lately, I focused mostly on the statistics of velocity circulation to study the intermittent nature of classical and quantum turbulent flows, performing high-resolution numerical simulations of these systems.

Personal Details

- **Date of Birth:** 23 August 1994 (28 years old)
- **Nationality:** Argentina / Switzerland

Education

PhD in Physics — *Nice, France*

Observatoire de la Côte d'Azur - Supervisor: Giorgio Krstulovic — *2019 - 2022*

- Thesis Title: *Quantum vortices, statistics of velocity circulation and excitations in superfluid turbulence*

***Licenciatura* in Physics Science (equivalent to Master of Science in Physics)** — *Buenos Aires, Argentina*

University of Buenos Aires — *2014 - 2019*

- **(Equivalent to) MS.c Thesis:** *Critical transition between 2D-3D flows in quantum turbulence — 2018-2019*
- **(Equivalent to) BS.c Thesis:** *Design and construction of a robust illumination system for SPIM Microscopy — 2017*

Participation in international conferences

School on Nonlinearity, complex phenomena and universality for waves — *Porquerolles, France*

Poster presentation — *15 - 20 May 2022*

- Title: *Anomalous scaling of velocity circulation in quantum turbulence*

Quantum Fluids School — *São Carlos, Brazil*

Poster presentation — *20 February - 4 March 2022*

- Title: *Anomalous scaling of velocity circulation in quantum turbulence*

GDR Turbulence — *Paris-Saclay, France*

Oral presentation — *27 - 29 October 2021*

- Title: *Intermittency of velocity circulation in classical and quantum turbulence*

WINE Conference — *Online*

Poster presentation — *1 - 2 July 2021*

- Title: *Kolmogorov and Kelvin wave cascades in quantum turbulence*

UK quantum fluids webinar series — *Online*

Oral presentation — *12 July 2021*

- Title: *Intermittency of velocity circulation in quantum turbulence*

24th Rencontre du non-linéaire — *Online*

Poster presentation — *24 - 26 March 2021*

- Title: *Intermittency of velocity circulation in quantum turbulence*

StatPhys 27 — *Buenos Aires, Argentina*

Oral presentation — *8 - 12 July 2019*

- Title: *Critical transition between 2D-3D flows in quantum turbulence*

Publications

[1] **N. P. Müller** and G. Krstulovic. Critical velocity for vortex nucleation and roton emission in a generalized model for superfluids. *Physical Review B* **105**, 014515 (2022).

[2] **N. P. Müller**, Y. Tang, W. Guo, and G. Krstulovic. Velocity circulation intermittency in finite-temperature turbulent superfluid helium. *Physical Review Fluids* **7**, 15 (2022).

[3] **N. P. Müller**, J. I. Polanco, and G. Krstulovic. Intermittency of Velocity Circulation in Quantum Turbulence. *Physical Review X* **11**, 011053 (2021).

[4] J. I. Polanco, **N. P. Müller**, and G. Krstulovic. Vortex clustering, polarisation and circulation intermittency in classical and quantum turbulence. *Nature Communications* **12**, 7090 (2021).

[5] B. Moretti, **N. P. Müller**, M. Wappner, and H. E. Grecco. Compact and reflective light-sheet microscopy for long-term imaging of living embryos. *Applied Optics* **59**, D89–D94 (2020).

[6] **N. P. Müller**, M.-E. Brachet, A. Alexakis, and P. D. Mininni. Abrupt Transition between Three-Dimensional and Two-Dimensional Quantum Turbulence. *Physical Review Letters* **124**, 134501 (2020).

[7] **N. P. Müller** and G. Krstulovic. Kolmogorov and Kelvin wave cascades in a generalized model for quantum turbulence. *Physical Review B* **102**, 134513 (2020).

Skills

Languages

- Spanish (*Native*)
- English (*Fluent in written and spoken*)
- German (*Intermediate*)
- French (*Intermediate*)

Computer

- Python (*Advanced*)
- Matlab (*Intermediate*)
- Julia (*Intermediate*)
- Fortran (*Basic*)