



## Luca Vialetto

Postdoctoral Scholar, Aeronautics and Astronautics

### Bio

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#### BIO

Luca Vialetto earned his master's degree in physics at the University of Padua (Italy) in 2017, with honour. His doctoral studies were conducted at the Dutch Institute for Fundamental Energy Research (Eindhoven, the Netherlands), with focus on computational modeling of plasmas for conversion of CO<sub>2</sub> into chemicals. He obtained the PhD in Applied Physics in November 2021 at the Eindhoven University of Technology, with honour. After that, he was employed as a postdoctoral researcher at Kiel University (Germany). Luca's research interests include plasma physics and chemistry, data driven models, and high performance computing. He is the recipient of the 2021 Student Award for Excellence given at the 74th Gaseous Electronics Conference and of the 2023 Rutherford Plasma Physics Communication Prize given by IOP.

#### HONORS AND AWARDS

- Stanford Energy Postdoctoral Fellowship, Stanford University (2023)
- Rutherford Plasma Physics Communication Prize, Institute of Physics (Oxford) (2023)
- Student Excellence Award, American Physical Society (2021)
- Doctoral Program PhD Thesis Distinction, Eindhoven University of Technology (Netherlands) (2021)
- Poster Prize for Plasma Modeling, Europhysics Conference on the Atomic and Molecular Physics of Ionized Gases (ESCAMPIG) (2018)

#### STANFORD ADVISORS

- Ken Hara, Postdoctoral Faculty Sponsor

#### LINKS

- Google Scholar: <https://scholar.google.com/citations?user=AT0Mxd8AAAAJ&hl=en>
- YouTube Channel: <https://www.youtube.com/@breakdownpodcast>
- Stanford Energy Postdoctoral Fellowship: <https://energypostdoc.stanford.edu/>

### Publications

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#### PUBLICATIONS

- **Electron inertial effects in the rarefied regime of a direct-current (DC) breakdown** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Mansour, A. R., Vialetto, L., Yamashita, Y., Hara, K.  
2024; 33 (11)
- **Benchmark calculations for anisotropic scattering in kinetic models for low temperature plasma** *JOURNAL OF PHYSICS D-APPLIED PHYSICS*  
Flynn, M., Vialetto, L., Fierro, A., Neuber, A., Stephens, J.

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2024; 57 (25)

- **Spatio-temporal analysis of power deposition and vibrational excitation in pulsed N<sub>2</sub> microwave discharges from 1D fluid modelling and experiments** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Altin, M., Viegas, P., Vialetto, L., van Rooij, G. J., Diomede, P.  
2024; 33 (4)
- **Particle Propagation and Electron Transport in Gases** *PLASMA*  
Vialetto, L., Sugawara, H., Longo, S.  
2024; 7 (1): 121-145
- **Plasma-induced reversible surface modification and its impact on oxygen heterogeneous recombination** *JOURNAL OF PHYSICS D-APPLIED PHYSICS*  
Afonso, J., Vialetto, L., Guerra, V., Viegas, P.  
2024; 57 (4)
- **Review: Machine learning for advancing low-temperature plasma modeling and simulation** *JOURNAL OF MICRO-NANOPATTERNING MATERIALS AND METROLOGY-JM3*  
Trieschmann, J., Vialetto, L., Gergs, T.  
2023; 22 (4)
- **Electron-neutral collision cross sections for H<sub>2</sub>O: II. Anisotropic scattering and assessment of the validity of the two-term approximation** *JOURNAL OF PHYSICS D-APPLIED PHYSICS*  
Budde, M., Dias, T., Vialetto, L., Pinhao, N., Guerra, V., Silva, T.  
2023; 56 (25)
- **A Modified Fokker-Planck Approach for a Complete Description of Vibrational Kinetics in a N-2 Plasma Chemistry Model** *JOURNAL OF PHYSICAL CHEMISTRY A*  
Altin, M., Vialetto, L., Longo, S., Viegas, P., Diomede, P.  
2022: 261-275
- **Electron-neutral collision cross sections for H<sub>2</sub>O: I. Complete and consistent set** *JOURNAL OF PHYSICS D-APPLIED PHYSICS*  
Budde, M., Dias, T., Vialetto, L., Pinhao, N., Guerra, V., Silva, T.  
2022; 55 (44)
- **Energy partitioning in N-2 microwave discharges: integrated Fokker-Planck approach to vibrational kinetics and comparison with experiments** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Altin, M., Viegas, P., Vialetto, L., van de Steeg, A. W., Longo, S., van Rooij, G. J., Diomede, P.  
2022; 31 (10)
- **Vibrational excitation cross sections for non-equilibrium nitric oxide-containing plasma** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Laporta, Vialetto, L., Guerra  
2022; 31 (5)
- **Charged particle kinetics and gas heating in CO<sub>2</sub> microwave plasma contraction: comparisons of simulations and experiments** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Vialetto, L., van de Steeg, A. W., Viegas, P., Longo, S., van Rooij, G. J., van de Sanden, M. M., van Dijk, J., Diomede, P.  
2022; 31 (5)
- **The Chemical Origins of Plasma Contraction and Thermalization in CO<sub>2</sub> Microwave Discharges** *JOURNAL OF PHYSICAL CHEMISTRY LETTERS*  
van de Steeg, A. W., Vialetto, L., da Silva, A., Viegas, P., Diomede, P., van de Sanden, M. M., van Rooij, G. J.  
2022; 13 (5): 1203-1208
- **Effect of anisotropic scattering for rotational collisions on electron transport parameters in CO** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Vialetto, L., Ben Moussa, A., van Dijk, J., Longo, S., Diomede, P., Guerra, Alves, L. L.  
2021; 30 (7)
- **Resolving discharge parameters from atomic oxygen emission** *PLASMA SOURCES SCIENCE & TECHNOLOGY*  
Viegas, P., Vialetto, L., van de Steeg, A. W., Wolf, A. J., Bongers, W. A., van Rooij, G. J., van de Sanden, M. M., Diomede, P., Peeters, F. J.

2021; 30 (6)

- **Plasma Modeling and Prebiotic Chemistry: A Review of the State-of-the-Art and Perspectives** *MOLECULES*

Longo, G., Vialetto, L., Diomede, P., Longo, S., Laporta, V.

2021; 26 (12)

- **Revisiting spontaneous Raman scattering for direct oxygen atom quantification** *OPTICS LETTERS*

van de Steeg, A. W., Vialetto, L., Silva, A. F., Peeters, F. J., van den Bekerom, D. M., Gatti, N., Diomede, P., van de Sanden, M. M., van Rooij, G. J.

2021; 46 (9): 2172-2175

- **Benchmarking of Monte Carlo flux simulations of electrons in CO<sub>2</sub>** *PLASMA SOURCES SCIENCE & TECHNOLOGY*

Vialetto, L., Viegas, P., Longo, S., Diomede, P.

2020; 29 (11)

- **Insight into contraction dynamics of microwave plasmas for CO<sub>2</sub> conversion from plasma chemistry modelling** *PLASMA SOURCES SCIENCE & TECHNOLOGY*

Viegas, P., Vialetto, L., Wolf, A. J., Peeters, F. J., Groen, P. C., Righart, T. H., Bongers, W. A., van de Sanden, M. M., Diomede, P.

2020; 29 (10)

- **Benchmark calculations for electron velocity distribution function obtained with Monte Carlo Flux simulations** *PLASMA SOURCES SCIENCE & TECHNOLOGY*

Vialetto, L., Longo, S., Diomede, P.

2019; 28 (11)

- **First hydrogen operation of NIO1: Characterization of the source plasma by means of an optical emission spectroscopy diagnostic**

Barbisan, M., Baltador, C., Zaniol, B., Cavenago, M., Fantz, U., Pasqualotto, R., Serianni, G., Vialetto, L., Wuenderlich, D.

AMER INST PHYSICS.2016: 02B319