

Jeffersson A. Agudelo Rueda

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Research Interest

- Plasma Physics, Magnetic Reconnection, Space Plasma Turbulence, Particle-in-cell Simulations.

Current Position

- Since 2022. *Postdoc researcher*, Department of Physics and Astronomy at Dartmouth College, Hanover, NH, United States.

Education

- 2019-2022. *PhD. in Space and Climate Physics*, Mullard Space Science Laboratory, University College London, Dorking, United Kingdom.
- 2013–2016. *Master of Science-Physics*. Universidad de Los Andes, Bogotá, Colombia.
- 2007–2012. *Physicist*. Universidad Nacional de Colombia., Bogotá, Colombia.

Awards, Fellowships and Grants

- March 2020. DiRAC HPC resource allocation 3.35M CPU hours. *Heating and Acceleration through Magnetic Reconnection in Space Plasma Turbulence*.
- March 2019. DiRAC HPC resource allocation 2M CPU hours. *Identifying and Quantifying the Role of Magnetic Reconnection in Space Plasma Turbulence*.
- Since 2019. Award of funding for PhD project *Identifying and Quantifying the Role of Magnetic Reconnection in Space Plasma Turbulence* from the European Space Agency Networking/Partnering Initiative.
- Since 2019. Joint funding for PhD through scholarship from Pasaporte a la Ciencia, Colombia.
- November 2012. Second place in the *Final exam in science efi-2012*.

Refereed Publications

- **Agudelo Rueda, J. A.**, Verscharen, D., Wicks, R. T., Owen, C. J., Nicolaou, G., Walsh, A. P., Zouganelis, I., Germaschewski, K. and Vargas Domínguez, S. (2021). *Three-dimensional magnetic reconnection in particle-in-cell simulations of anisotropic plasma turbulence*. *Journal*

of *Plasma Physics*, 87(3).

- **Agudelo Rueda, J. A.**, Verscharen, D., Wicks, R. T., Owen, C. J., Nicolaou, G., Walsh, A. P., Zouganelis, I., Germaschewski, K. and Vargas Domínguez, S. (2021). *Energy transport during 3D small-scale reconnection driven by anisotropic turbulence using PIC simulations*, under revision ApJ.
- Maruca, B. A., **Agudelo Rueda J. A.**, Bandyopadhyay, R., Bianco, F. B., Chasapis, A., Chhiber, R., Dewese, H., Matthaeus, W. H., Miles, D. M., Qudsi, R. A., Richardson, M. J., Servidio, S., Shay, M. A., Sundkvist, D., Verscharen, D., Vines, S. K., Westlake, J. H., Wicks, R. T. (2021) *MagneToRE: Mapping the 3-D Magnetic Structure of the Solar Wind Using a Large Constellation of Nanosatellites*, Front. Astron. Space Sci. 8: 665885.
- Jeong, S., Verscharen, D., Vocks, C., Abraham, J. B., Owen, C. J., Wicks, R. T., Fazakerley, A. N., Stansby, D., Bercic, L., Nicolaou, G., **Agudelo Rueda, J. A.**, Bakrania, M. (2022) *The Kinetic Expansion of Solar-Wind Electrons: Transport Theory and Predictions for the very Inner Heliosphere*, The Astrophysical Journal, 927, 162.
- Jeong, S., Abraham, J. B., Verscharen, D., Bercic, L., Owen, C. J., Stansby, D., Nicolaou, G., Wicks, R. T., Fazakerley, A. N., **Agudelo Rueda, J. A.**, Bakrania, M. (2022) *The Stability of the Electron Strahl against the Oblique Fast-magnetosonic/Whistler Instability in the Inner Heliosphere*, The Astrophysical Journal Letter, 926, L26.
- Abraham, J. B., Owen, C. J., Verscharen, D., Bakrania, M., Stansby, D., Wicks, R. T., Nicolaou, G., Whittlesey, P. L., **Agudelo Rueda, J. A.**, Jeong, S. Bercic, L. *Radial evolution of thermal and suprathermal electron populations in the slow solar wind from 0.13 to 0.5 au using machine learning: Parker Solar Probe observations*, submitted to ApJ.

Invited talks and conference presentations

- 2 - 5 August 2021. Poster presentation: *3D small-scale turbulent reconnection: energy transport and transfer.*, SHINE Online 2021 Symposium, Online.
- 19 - 23 July 2021. Oral presentation: *Energy distribution during 3D small scale magnetic reconnection in plasma turbulence*, NAM 2021, online.
- 28 April 2021. Invited seminar presentation: *3D small scale reconnection in PIC simulations of anisotropic Alfvénic turbulence*, Northumbria University Newcastle, online.
- 19 - 30 April 2021. Oral presentation: *Energy transport during 3D small-scale reconnection driven by anisotropic turbulence using PIC simulations*, vEGU 2021, online.
- 8 April 2021. Invited talk: *Three-dimensional magnetic reconnection in particle-in-cell*

- simulations of anisotropic plasma turbulence*, Solar Orbiter Working Group: Reconnection and Small-scale Structure, online.
- 27 March 2021. Invited seminar presentation: *Three-dimensional magnetic reconnection in particle-in-cell simulations of anisotropic plasma turbulence*, Universidad Nacional de Colombia, online.
 - 1 - 17 December 2020. Oral presentation: *Spontaneous Reconnection in Three-Dimensional Particle-In-Cell Simulations of Collisionless Plasma Turbulence*, AGU 2020 Fall Meeting, online.
 - 10 September 2020. Invited talk: *Identifying and Quantifying the Role of Reconnection in Space Plasma Turbulence*, DiRAC day, 2020, online.
 - 4 - 8 May 2020. Oral presentation: *Identifying and Quantifying the Role of Reconnection in Space Plasma Turbulence*, EGU 2020 General Assembly, online.
 - 5 March 2020. Invited seminar presentation: *Identifying and Quantifying the Role of Reconnection in Space Plasma Turbulence*, Queen Mary University of London, London, United Kingdom.
 - 24 January 2020. Poster presentation: *Identifying and Quantifying the Role of Reconnection in Space Plasma Turbulence*, Autumn MIST (Magnetosphere, Ionosphere and Solar-Terrestrial), London, United Kingdom.
 - 18 December 2019. Outreach oral presentation: *What do space scientists do? and how is space exploration in the XXI century?: Turbulence and Magnetic Reconnection*, Planetarium of Bogotá, Bogotá, Colombia.
 - 10 - 11 October 2019. Oral presentation: *Identifying and Quantifying the Role of Reconnection in Space Plasma Turbulence*, SWA consortium meeting, MSSL, Dorking, Surrey, United Kingdom
 - 29 July - 3 August 2018. Attendee to the Solar Heliospheric and Interplanetary Environment (SHINE) Workshop, Cocoa Beach, Florida, United States.
 - 18 - 22th September, 2017. Oral and poster presentation: *Study of the Magnetosphere Currents Coupling and Effects on Europa's Induced Magnetic Field*, International School of Space Science on "Complexity and Turbulence in space Plasmas", L'Aquila, Italy.
 - 23 - 27 November 2015. Poster presentation: *Study of Magnetic Coupling Between Europa's Induced Field and Surrounding Plasma Currents' Field*, 12th European Space Weather Week, Oostende, Belgium.
 - 7 - 10 November 2011. Attendee to the Second Low-Latitude Ionospheric Sensor Network Workshop, INPE, Sao Jose dos Campos-SP-Brazil.
 - 3 - 7 October 2011. Oral presentation: *Influence of the CME Occurred on June 7TH, 2011 on the Colombian Ionosphere Through Changes in the Total Electron Content(TEC)*, XXIV National Congress of Physics, Bogotá, Colombia.
 - 5 - 9 October 2009. Oral presentation: *Building the Classical Harmonic Oscillator Propagator*

Through The Feynman Path Integral, XXIII National Congress of Physics, Santa Marta, Colombia.

Training courses

- 1 - 5 March 2021. *DiRAC Virtual AI-athon*, Online.
- 1 - 6 September 2019. *STFC Advanced Summer School in Solar System Plasmas*, Lancaster University, Lancaster, United Kingdom.
- 26 - 30 August 2019. *STFC Introductory Solar System Plasmas Summer School*, Aberystwyth University, Aberystwyth, United Kingdom.
- 11 - 15 December 2017. *1er. Taller Métodos de Lattice Boltzmann*, Universidad Nacional de Colombia, Bogotá, Colombia.
- 3 - 19 July 2012. *Solar Astrophysics, and Modern Trends Techniques*, Universidad Nacional de Colombia, Bogotá, Colombia.

Professional Experience

- 2020-2021. Postgraduate Teaching Assistant, University College London, London, UK. PGTA for the modules: *IRDR0007: Space Weather and Technological Failures*, *SPCE0005: Space Plasma and Magnetospheric Physics*, *SPCE0010: Planetary Atmospheres*.
- 2020. Co-advisor of the RAS/UCL summer student project *Turbulence at kinetic scales in the solar wind using PIC simulations*.
- 2014-2018. Full-time faculty instructor, Universidad Católica de Colombia, Bogotá, Colombia. Adjunct faculty instructor from 2014 to 2016 and full-time faculty instructor from 2017 to 2018. Teaching differential and integral calculus, mechanics, optics, waves, electromagnetism and computing methods as well as a short summer course *An introduction to text writing using L^AT_EX*.
- 2017-2018. Adjunct faculty instructor, Universidad de Bogotá Jorge Tadeo Lozano, Bogotá, Colombia. Adjunct faculty instructor from 2017 to 2018. Teaching electromagnetism.
- 2013–2016. Master student, Universidad de los Andes, Bogotá, Colombia. I studied and researched the induced magnetic field on Jupiter's moon Europa due to Jupiter's time varying magnetic field and plasma currents.
- 2013–2015. Assistantship, Universidad de los Andes, Bogotá, Colombia. Assistant of experimental physics courses.
- 2013. Occasional instructor of the outreach program “*Talentos Científicos*”, Universidad Sergio Arboleda. Occasional instructor travelling to countryside schools to teach physics concepts and experiments and to encourage young people to pursue careers in science.
- 2011–2012. Student researcher at the Research group ARGOS, Geospatial physics laboratory, Universidad Nacional de Colombia Bogotá, Colombia. Charged with collection, processing and analysis of data.

Computational skills

- Simulation and Programing: C++, Fortran.
- Data Visualisation and Analysis: Paraview, Python and Matlab.
- High Performance Computing (HPC) Experience:
 - Co-author of the proposal *Heating and Acceleration through Magnetic Reconnection in Space Plasma Turbulence* to the UK's leading HPC facility DiRAC.
 - 12 months using the highly parallelized Plasma Simulation Code (PSC) in the UK's leading HPC facility DiRAC, DIaL.
 - Six months using the MPI parallelized Magnetic Inner Core (MagIC) code in the HPC Cluster of the Universidad de Los Andes.

Additional information

- *First author of a Booklet about basic physics: Mechanics.* Written in Spanish.
- *co-author of a Booklet about basic physics: Electromagnetism.* Written in Spanish.
- Co-advisor of the bachelor project: *Desarrollo de un sistema de planificación de trayectorias de un robot agrícola para la aplicación de agroquímicos en cultivos*, Universidad Católica de Colombia, Bogotá, Colombia.