Karol Fułat

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Except of the elegance of theory and cleverness of experiment, I love how physics expands our horizons, how affects the perception of the world. Apart from the scientific aspect of this subject, I believe physics facilitates people's lives and shows problems from a different view.

SKILLS

Programming languages	Python, Fortran, C++, IDL
Technical and software	4 years of experience with particle-in-cell (PIC) code, High Performance Computing (using MPI), scientific Python packages (NumPy, SciPy, Numba), machine learning basis (scikit-learn), Git, Matlab
Foreign languages	fluent English, basic French

EDUCATION

2021/07 – present

PhD in Astroparticle Physics

Institute of Physics and Astronomy, University of Potsdam, Potsdam, Germany

- Theoretical Astroparticle Physics Group, supervisor: Prof. Martin Pohl, collaboration with THAT group in DESY, Zeuthen
- Project topic: *Electron acceleration at collisionless shocks with quasi-perpendicular magnetic field*
- In short: PIC simulations of SNRs shocks with an upstream turbulence
- Funded by DFG German Research Foundation

2020/02 – 2021/06

M.Sc. in Technical Physics

AGH University of Science and Technology, Krakow, Poland

- Dissertation: *Study of the Conditions for Effective Electron Acceleration in Low Mach Number Shocks*, supervisor: Prof. Jacek Niemiec
- In short: PIC simulations of low Mach number shocks with different plasma beta
- XXIII competition for the best thesis "Diamenty AGH": best theoretical thesis at the Faculty of Physics and Applied Computer Science

2016/10 – 2020/01

B.Sc. in Technical Physics

AGH University of Science and Technology, Krakow, Poland

- Dissertation: *Shock Waves in Merging Galaxy Clusters*, supervisor: Prof. Jacek Niemiec
- In short: PIC simulation of low Mach number shock with strong electron firehose instability waves

RESEARCH AND WORK

2019/05 – 2021/11

Internship

The Henryk Niewodniczanski Institute of Nuclear Physics, Krakow, Poland

- Project topic: *Shock Waves as the Origin of High-energy Particles*, supervisor: Prof. Jacek Niemiec
- Funded by National Science Center Poland, research project no 2019/33/B/ST9/02569

2020/02 – 2020/06

Internship

European Space Agency ESAC, Villanueva de la Canada, Spain

- Project topic: *Characterising Suprathermal Electrons at Interplanetary Shocks*, supervisor: Dr. Georgina Graham

2018/11 – 2020/07

Programming and maths teacher

EDU.EXE Ewelina Kurek, EUREKA Monika Wójcik, Krakow, Poland

- Extracurricular courses for children in primary school

CHOSEN CONFERENCES

2022

PIC simulations of SNRs shock waves with a turbulent upstream medium.

Fułat, K., Pohl, M., Bohdan, A. & Morris, P.

Presentation during HEDLA 2022 conference, Lisbon

Presentation during XXVIII EPIPHANY Conference, Krakow

Poster presentation during Gamma 2022 conference, Barcelona

2021

Electron Pre-acceleration Through Stochastic Shock Drift Acceleration at Intracluster Shocks.

Niemiec, J., Kobzar, O., Fułat, K., Pohl, M., Amano, T., Hoshino, M., Matsukiyo, S., & Matsumoto, Y.

Proceedings of 37th International Cosmic Ray Conference — PoS(ICRC2021). Published.

2020

Particle-In-Cell Simulations of Shock Waves in Merging Galaxy Clusters.

Fułat, K., Kobzar, O., & Niemiec, J.

Proceedings of HPC Users Conference, ACC Cyfronet AGH

2020

Characterising Suprathermal Electrons at Interplanetary Shocks.

Fułat, K. & Georgina, G.

Proceedings of SKK Conference, Polish Space Agency

Presentation during SKNS Conference, AGH UST – 1st award