

Prospective supervisor's form

Name of the supervisor: Jan Franz

Academic title: Prof. PG, Dr. hab.

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Gdańsk University of Technology Faculty of Applied Physics and Mathematics

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Discipline: physical sciences [NF] none Optional

Key words (obligatory four key words describing research interests / expertise):

Antimatter

Scattering Theory

Astrochemistry

Monte Carlo Simulation

Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 31 / 31

2. Citations excluding self-citations WoS 396 Scopus 371

3. Hirsch index WoS 12 Scopus 12

1. The number of PhD students who have graduated under your supervision: 0

2. The number of PhD students currently supervised:

a. within the current doctoral school 0

b. within doctoral studies (previous s) 0

3. Are you currently accepting new PhD students:

a. Polish Yes/No Yes

b. Foreign Yes/No Yes

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Research interests or topics offered for PhD research (no more than 2000 characters)ⁱⁱ

Title: Monte Carlo simulations of energetic electrons and positrons in condensed matter

The main aim in the first year is to learn how to perform Monte-Carlo simulations of electron transport in condensed matter. We will use the Monte-Carlo computer program, which is developed by our collaborators in the group of Maurizio Dapor in Trento [1]. During the second year we will investigate the influence of different cross section data on the secondary electron emission spectrum from different materials [2]. We will develop several scattering models and investigate how the results from Monte-Carlo simulations are influenced by these models. During the third and fourth year we will study the interaction of positron beams with condensed matter.

Literature:

[1] M. Dapor, Transport of Energetic Electrons in Solids, 2nd edition, Springer (Cham, 2017).

[2] R. F. Egerton, Electron Energy-Loss Spectroscopy in the Electron Microscope, 3rd edition Springer (Cham, 2013).

Funding or special equipment needed to carry out a PhD project ⁱⁱⁱ:

1. Is funding available for experimental work: *Yes/No/not needed*

Yes

2. Is the equipment needed to complete a PhD project

available in your lab/department: *Yes/No/not needed*

Yes

Most important publications – no more than 5 published after 1.01.2018

No	Authors/title/journal	Number of points according to the current list of the Ministry of Science and Higher Education	Publication year
1.	J. Franz, B. Mant, L. Gonzalez-Sanchez, R. Wester, F. A. Gianturco Rotational state-changing collisions of C ₂ H ⁻ and C ₂ N ⁻ anions with He under interstellar and cold ion trap conditions: a computational comparison Journal of Chemical Physics, submitted 2020	100	2020
2.			

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3.			
4.			
5.			

Most recent externally funded projects you were involved in – no more than 3

No	Project title, the name of the Principal Investigator (PI) and the institution the project was carried out	Years	Role in the project ⁱ
1.	Title: Low-energy electron (and positron) scattering on atoms and molecules - experiments and theory. PI: dr hab. Kamil Fedus (Torun). Institutions: Nicolaus Copernicus Univ. and PG.	2014-18	R
2.	Title: Electron and positron scattering on atoms and molecules PI: dr hab. Jan Franz Institution: WCSS Wroclaw Centre for Networking and Supercomputing	since 2016	PI
3.	Title: Investigation of rotational state-changing collisions of CCN ⁻ ions with helium. PI: dr hab. Jan Franz (Gdansk). Institutions: PG and University of Innsbruck (Austria)	2018-2020	PI

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Additional relevant informati (no more than 1600 characters)^v

Co-supervisor of one PhD-student (Rui Zhang)
Period of time: 11/2006 - 10/2010
Institution: Department of Physics and Astronomy, University College London (UCL), London, UK
Awards: The student (Rui Zhang) received the Great Britain-China educational award for her thesis.

- ⁱ You may select up to two disciplines out of 12 disciplines represented in the Doctoral School
- ⁱⁱ Observe the limit of not more than 2000 characters
- ⁱⁱⁱ Leave only one answer
- ^{iv} Select the role in the project: PI stands for principal investigator (refers to the holder of an independent grant and the lead researcher for the grant project), Co-I for co-investigator (Co-I assists the principal investigator in the management and leadership of the research project), R for researcher
- ^v Add any other relevant information e.g. awards for PhD students whom you supervised (no more than 1600 characters)