

Prospective supervisor's form

Name of the supervisor: Józef Eugeniusz Sienkiewicz

Academic title: Prof. Dr.

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Discipline: physical sciences [NF] none

Optional

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

atomic physics

chemical physics

plasmon physics

computational physics

Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 56/61

2. Citations excluding self-citations WoS 552 Scopus 662

3. Hirsch index WoS 13 Scopus 13

1. The number of PhD students who have graduated under your supervision: 8

2. The number of PhD students currently supervised:

a. within the current doctoral school 0

b. within doctoral studies (previous systems) 1

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

1. Calculations of relativistic structures of heavy and recently discovered superheavy atoms. That may include estimations of the atomic electric dipole moments (EDM) as a sign of symmetry breaking as foreseen by the standard model of particle physics.
2. Diatomic and triatomic molecules. Studies of different properties like electronic and rovibrational structure and transition moments with the possible inclusion of spin-orbit couplings. Development of software needed for spectra assignment. Studies of association and dissociation processes by time-dependent methods.
3. Modeling selected plasmonic systems in the nanoscale, in particular arrays of gold and silver nanoparticles, and metamaterials. Simulations of electromagnetic field propagation through these systems.

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

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

2. Is the equipment needed to complete a PhD project available in your lab/department: *Yes/No/not needed*

Most important publication 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.	R. Kozioł, M. Łapinski, P. Syty, D. Koszelow, W. Sadowski, J.E. Sienkiewicz, B. Kościelska/ Evolution of Ag nanostructures created from thin films: UV-vis absorption and its theoretical predictions/ Beilstein Journal of Nanotechnology	100	2020
2.	T. Lewandowski, M. Walas, A. Synak, P. Syty, J.E. Sienkiewicz, R. Kozioł, M. Łapinski, W. Sadowski, B. Kościelska/ Structure, luminescent properties and FDTD simulation of TeO ₂ -BaO-Bi ₂ O ₃ -Ag: Ln(3+) glass-ceramics system/ Journal of Luminescence	70	2019

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3.	P. Syty, J.E. Sienkiewicz, L. Radžiute, G. Gaigalas, P. Rynkun, J. Bieroń/ Continuum wave functions for estimating the electric dipole moment: Calculation based on a multiconfiguration Dirac-Hartree-Fock approximation/ Physical Review A	100	2019
4.	A. Gapska, M. Łapiński, P. Syty, W. Sadowski, J.E. Sienkiewicz, B. Kościelska/ Au–Si plasmonic platforms: synthesis, structure and FDTD simulations/ Beilstein Journal of Nanotechnology	100	2018
5.	P. Jasik, J. Kozicki, T. Kilich, J.E. Sienkiewicz, N.E. Henriksen/ Electronic structure and rovibrational predissociation of the 2(1)Pi state in KLi/ Physical Chemistry Chemical Physics	100	2018

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.	Theoretical simulation of vibrational spectroscopies based on the Raman effect, Julien Guthmuller, Gdańsk University of Technology	2012-2016	Co-I
2.	Ultrafast charge transfer in ion-atom collision investigated by molecular quantum dynamics methods, Marta Łabuda, Gdańsk University of Technology	2011-2013	Co-I
3.	Structural studies of diatomic molecules and dynamics of processes in the field of strong ultra-short electromagnetic pulses, Józef E. Sienkiewicz, Gdańsk University of Technology	2010-2012	PI

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Additional relevant information – (no more than 1600 characters)^v

List of selected achievements

1. Relativistic configuration interaction method for calculations of elastic electron scattering from atoms.
2. Structure and dipole transfer momenta of diatomic lithium.
3. Two joint Polish-French promotions on charge transfer and quantum dynamics.

Proposals of specific projects

1. Energy levels of Oganesson (Og is a synthetic chemical element with atomic number 118 synthesized in 2002, cooperation with Jagiellonian University)
2. Deperturbation models of diatomic spectra (a computational model with adjusted parameters to reconstruct experimental spectra).
3. Quantum dynamics in attosecond regime (solutions of the time-dependent Schrödinger equation for attosecond laser impulses).
4. Optical properties of titanium and gold nanostructures (calculations of surfaces plasmon resonances).

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)