

JOB OFFER

Position in the project:	PhD student
Scientific discipline:	Physics
Job type (employment contract/stipend):	Employment contract
Number of job offers:	1
Remuneration/stipend amount/month (“X0 000 PLN of full remuneration cost, i.e. expected net salary at X 000 PLN”):	Remuneration total cost 6 000 PLN (expected net salary at 4 200 PLN)
Position starts on:	1.10.2017
Maximum period of contract/stipend agreement:	35 months
Institution:	Institute of High Pressure Physics of the Polish Academy of Sciences, Terahertz Laboratory (TeraGaN) NL-11, Warsaw, Poland http://www.unipress.waw.pl/teragan/
Project leader:	Prof. dr hab. Wojciech Knap
Project title:	<i>Terahertz Sensor Based on Topological Materials</i>
Project description:	<p>Project is carried out within the TEAM programme of the Foundation for Polish Science</p> <p>Despite the long time from its discovery, there exists still many important problems hindering real world applications of topological isolators (TI). The main problems are: i) TI states are preserved only at cryogenic temperatures (below 10 K); ii) there are no structures/mechanisms allowing fast electrical switching (on/off) of TI states iii) until now most of the discoveries are made using HgTe/CdTe semiconductor materials that do not allow standard high temperature device processing. The general scientific objective of this project is to research on novel two-dimensional structures possessing topological insulator phase that overcomes these existing problems. These novel topological insulators will be obtained special arrangements of III-V or II-VI semiconductor quantum wells. We will search for the best TI semiconductor structures by growing different structures and by tuning the energy band structure with hydrostatic pressure. We will particularly focus on the investigation of hydrostatic pressure driven evolution of basic properties because it allows accelerate research on finding the best parameters (energy band structure, energy and momentum relaxation times, and photon absorption and emission coefficients) in different topological phases without use of very time and budget consuming repetitive growth of the multiple structures. We will use “optical” excitations in Terahertz frequencies range as the main experimental tool. The measurements of inter- and intra-Landau level transitions, lying in THz range, as well as THz photoconductivity will be used to probe the band structure evolution. Independently, research on new THz plasma oscillation/instabilities in different topological insulators phases will be explored as an independent important scientific objective of the project. Thanks to these research we want to answer the basic science questions about the universality of the physical model of 2D TI and about mechanisms of breaking of the topological protection. We want also to answer the question how specific TI states and Dirac fermions (linear dispersion) in TI may modify/influence the THz plasma wave oscillations</p>

	<p>and instabilities discovered recently in nanometer size 2D structures. Acquired answers for questions mentioned above will provide basis for realizing new high frequency devices based on topological materials. To reach such devices the project proposes the research on innovative HgCdTe and GaSb/InAs structures overcoming existing up today problems: i) having TI states preserved up to elevated temperatures (up to 300 K) ii) allowing fast electrical switching (on/off) of TI states iii) explore GaSb/InAs quantum TI structures that can be fabricated using a standard semiconductor processing. Preliminary research that show importance, feasibility and methodology has already started in the frame of international French/Polish/Russian "LIA-TERAMIR". Feasibility of main project objectives is already documented by multiple high impact international journals publications of the project author. LIA-TERAMIR will also serve for the present project as the main frame of international collaboration providing, via partners from France and Russia, a privileged access to unique material/samples technology and equipment. At the same time the project will allow to increase the research potential in Poland, at IHPP PAS, by building by world-class leaders, the TEAM having strong international collaborations and performing basic/applied physics research on TI structures (TERA-TEAM) in view of demonstration of innovative TI based high frequency devices as well as terahertz radiation sensors.</p>
Key responsibilities include:	<ol style="list-style-type: none"> 1. Magnetotransport measurements of topological materials under hydrostatic pressure 2. Optical investigations of THz plasma oscillations and instability of plasma
Profile of candidates/requirements:	<ol style="list-style-type: none"> 1. Completed higher education studies; 2. Status of doctoral student (third level degree student); 3. Documented scientific achievements in the form of publications will be an asset; 4. Knowledge of solid state physics, semiconductor physics, and quantum mechanics; 5. Experience in conducting of magnetotransport research will be an asset; 6. Experience in semiconductor research using high pressure liquid chambers; 7. Experience in the study of topological materials will be an asset; 8. Good spoken and written English; 9. Motivation for research work.
Required documents:	<ol style="list-style-type: none"> 1. Application 2. CV 3. Summary of professional accomplishments with concise information about the candidate's academic interests and past achievements, as well as possible participation in larger research projects (in a volume not exceeding 3500 characters). 4. A copy of the higher education diploma. 5. Confirmation of doctoral student status
We offer:	<p>work in an international research team at the well-recognized Institute in Pressure Research. Cooperation with foreign centers: University of Montpellier, Institute for Physics of Microstructures of Russian Academy of Sciences Nizhny Novgorod, Johann Wolfgang Goethe-Universität Berlin, Center for Physical Sciences and Technology Vilnius, Nanoscience Institute of the National Research Council (CNR-NANO) Pisa.</p>
Please submit the following documents to:	<p>knap.wojciech@gmail.com</p>

	CC: gc@unipress.waw.pl
Application deadline:	3.09.2017
For more details about the position please visit (website/webpage address):	<p>The recruitment procedure is described in the TEAM call documentation in section 5.4 and available on the FNP website http://www.fnp.org.pl/assets/TEAM_Programme_Competition_Documentation_4_2017-1.pdf</p> <p>Recruitment interviews will be held on 14 and 15 September 2017 at IHPP PAS in Warsaw, address: al. Prymasa Tysiąclecia 98 in the New Technology Building, starting from 10.00 AM. In a case of a requirement from an applicant side it could be changed to the skype interview.</p>
Euraxess job/stipend offer (in case of PhD and postdoc positions):	https://euraxess.ec.europa.eu/jobs/237164

Please include in your offer:

“I hereby give consent for my personal data included in my application to be processed for the purposes of the recruitment process under the Personal Data Protection Act as of 29 August 1997, consolidated text: Journal of Laws 2016, item 922 as amended.”