



**PEGASUS @PEGASUS\_H2020**

*Plasma Enabled and Graphene Allowed Synthesis  
of Unique nano Structures*

Coordinated by Elena Tatarova – IPFN



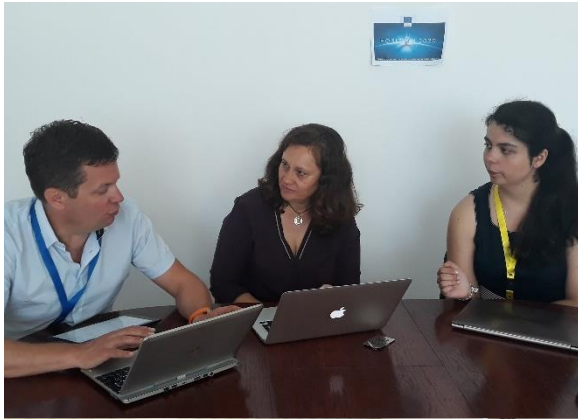
## H2020 PEGASUS – First International Workshop

The first international workshop of the PEGASUS Project took place during the course of 8<sup>th</sup> International Workshop and Summer School of Plasma Physics (IWSSPP), in Kiten, Bulgaria, from 10 to 17 of June 2018. The PEGASUS workshop was a great opportunity to share the Project's goals and ambitions with the scientific community, which demonstrated great interest in the recent achievements. All the partner institutions from the consortium participated by presenting their progress and contributions to the Project up to now. This included lectures on materials synthesis and characterization with emphasis on graphene and N-graphene structures. The workshop was the perfect occasion to host informal meetings between the partners, who shared recent results and discussed the planning of future milestones. The presence of collaborators from every partner institution prompted an exchange of expertise, as well as the exchange of materials between groups. Thanks to all the participants and to the local organizing committee of the 8<sup>th</sup> IWSSPP, the first international workshop of the PEGASUS Project was a success.



The PEGASUS open seminar was chaired by Dr. Elena Tatarova, the Project Coordinator. The workshop started with a brief introduction to the Project followed by a presentation by Prof. Zhivko Kiss'ovski, from Sofia University St. Kliment Ohridski, who demonstrated a system for deposition of carbon nanostructures at atmospheric pressure conditions. From the same University, Prof. Evgenia Valcheva presented measurements of electrical conductivity of free-standing N-graphene sheets and Dr. Neno Todorov showed Raman spectroscopy of graphene and nitrogen doped graphene flakes, highlighting the effects of the synthesis technology and the measurement conditions on the spectra lines parameters.

Prof. Uros Cvelbar, from Jožef Stefan Institute in Slovenia, gave a lecture on how plasmas can build 2D carbon nanostructures. From the same Institute, Dr. Gregor Filipič and Neelakandan Marath Santhosh showed recent results in their presentations *Atmospheric plasma deposition of copper oxide 2D nanostructures* and *Plasma-assisted bottom-up approach for the synthesis of vertically aligned carbon nanostructures using polymer gels*, respectively.



Regarding diagnostics, Prof. Amelia Almeida, from Instituto Superior Técnico, University of Lisbon, presented techniques for the characterization of nanomaterials, as well as their specific applications and validity regimes. Dr. Thomas Strunskus, from the Institute for Materials Science in CAU Kiel, presented the diagnostic technique of Near-Edge X-ray Absorption Fine Structure Spectroscopy (NEXAFS) applied in the analysis of carbon materials synthesized by plasmas.



Dr. Johannes Berndt, from GRÉMI, University of Orléans, gave a lecture on plasma based deposition of conductive polymers and also presented the work by Cédric Pattyn with a talk on *Polymerization and negative ion formation in reactive hydrocarbon plasmas*. Prof. Eva Kovacevic (GREMI) gave a lecture on nanocomposites for chemical detection.



Several collaborators of the Institute of Plasmas and Nuclear Fusion, University of Lisbon, presented their progress on Project related topics. The theoretical modelling of N-doped graphene formation in microwave plasmas was explained by Dr. Dzmitry Tsyhanou. Dr. Neli Bundaleska presented a post-treatment plasma-based approach to produce N-graphene structures. In his lecture, Dr. Francisco Dias presented an in-situ plasma based method to synthesize N-graphene structures at large scale. Graphene nanocomposites were also addressed by PhD

student Ana Dias, with emphasis on their use in biosensing applications.

Informal round table discussions between lead partners and collaborators of the Project took place daily after the public sessions of the Workshop. Recent results were shared between beneficiaries and plans for the next steps in the Project were discussed. N-graphene free standing structures and vertical alignment of graphenes were the main topics addressed.

**Project Coordinator**

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# 8<sup>th</sup> International Workshop & Summer School on Plasma Physics



10 – 17 June 2018  
Kiten, Bulgaria

## PEGASUS Workshop

<b>11 June</b>	<b>17:00 – 18:00</b>	<b>Round-table discussion</b> (PEGASUS members)
	Chair: Elena Tatarova	Organization issues
<b>12 June</b>	<b>9:00 – 13:00</b>	<b>Seminar PEGASUS</b>
	Chair: Elena Tatarova	
	<b>9:00 – 9:05</b>	Welcome
	E. Tatarova	
	<b>9:05 – 9:30</b>	System for deposition of carbon nanostructures at atmospheric pressure
	J. Kissovski	
	<b>9:30 – 9:55</b>	Growth of copper oxide nanowalls
	G. Filipic	
	<b>9:55 – 10:20</b>	Plasma-assisted bottom-up approach for the synthesis of vertically aligned carbon nanostructures using polymer gels
	N. M. Santhosh	
	<b>10:20 – 10:45</b>	Electrical conductivity of free-standing N-graphene sheets
	E. Valcheva	
	<b>11:15 – 11:40</b>	<b>Coffee Break</b>
	N. D. Todorov	Raman spectroscopy of graphene and nitrogen doped graphene flakes: effects of the synthesis technology and the measurement conditions on the spectra lines parameters
	<b>11:40 – 12:05</b>	3D-Mechanism of nitrogen-doped graphene formation in microwave plasmas
	D. Tsyganov	
	<b>12:05 – 12:30</b>	Nanoparticle formation and thin film deposition in aniline containing plasmas
	C. Pattyn	
<b>13 June</b>	<b>17:00 – 19:00</b>	<b>Round-table discussion</b> (PEGASUS members)
	Chair: Elena Tatarova	Free-standing structures
<b>14 June</b>	<b>17:00 – 19:00</b>	<b>Round-table discussion</b> (PEGASUS members)
	Chair: Uroš Cvelbar	Vertical graphenes on metal substrates
<b>15 June</b>	<b>17:00 – 19:00</b>	<b>Round-table discussion</b> (PEGASUS members)
	Chair: Elena Tatarova	Free discussion