

POSITIONBx. № 219 / 30.07.2020

On the competition for acquisition of the academic position "professor" on scientific direction "Physical sciences", scientific specialty "Electrical magnetic and optical properties of the condensed matter", with candidate assoc. prof. dr Georgi Lalev Dyankov, IOMT, BAS., from prof. DSc Minko Petrov ISSP, BAS.

Assoc. prof G. Dyankov participates with 8 publications A₁-A₈ equivalent to a habilitation research works and 14 publications, B₁₋₁₄ outside the habil. research work following the minimal national requirements. Presented are 5 patents C₁₋₅. G. Dyankov participated in a set of international and national conferences with oral or poster presentations. He was supervisor of 3 PhD students. He has also a wide teach. activity and is coauthor of set of textbooks for 7-9 classes. He participates in a set of scientific contracts in the field of micro and nanophotonics. 108 independent citations are presented.

Assoc. prof. dr G. Dyankov is a completed specialist on optics and optical methods and their application in the condensed matter physics. The scientific and scientific-application activity of Dyankov is directed to contemporary problems of the photonics and in particular that of plasmonics. The surface plasmonic resonance, induced on the Kretschman equipment or on the diffraction grating, studied by him both theoretically and experimentally, allows the method to be applied in the sensing techniques as well as the very weak physico-chemical processes to be detected. This is particularly important for the investigation of the biological processes where, due to their very weak manifestation the common physical methods are not effective. Dyankov reaches an adequate coordination of the applied theoretical and experimental methods allowing an adequate explanation of the physical processes in a set of materials in particular bio materials. He achieves a good correlation of the equipment components like lasers, polarizations and detectors allowing a precise measurements. A significant achievement of the works of Dyankov is the immobilization of the biological materials like hemoglobin on the surface. By MAPLE methods one achieves an adequate immobilization of bio materials and a high bio sensitivity (A₁). For elaboration of the sensing qualities of the surface plasmon resonance, Dyankov introduces a liquid crystal medium as a dielectric in contact with golden layer at Kretschman method (A₂-A₅). This allows the characteristic optical characteristics like the strong birefringence to be used for the optical and electrooptical tuning of the photonic devices. Of an especial meaning is the applying for the first time of the chiral and ferroelectric smectic C* liquid crystals. Such a dielectric medium in the plasmonic resonance allows by the chiral pitch and the tilt angle with respect to the layer's plane, the number of the tunable parameters to be enhanced thus the sensitivity to be increased. On the base of bi metallic surface an optimization of the plasmonic characteristics and their direction along the bio-chips and bi-plasmons, important for the color plasmonic techniques is achieved (A₆-A₈).

CONCLUSION:

Assoc. prof. dr Georgi Dyankov has a significant contribution in the contemporary development of the plasmonic and sensing, in particular bio-sensing techniques. He achieves the requirements for the academic position "professor" and I recommend Georgi Dyankov to receive the position "professor".

28.07.2020

Prof. DSc Minko Petrov

