

Ph.D Position in Biophysics and Optical Spectroscopy

Budapest University of Technology and Economics, 1111 Budapest, Budafoki ut 8.

[MTA-BME Lendület Magneto-optical Spectroscopy Research Group](#)

A Ph.D position is available in the Department of Physics at the Budapest University of Technology and Economics. The Applicant can participate in the following projects: i) magneto-optical diagnosis of malaria, ii) magnetoelectric metamaterials and magnetic nanoparticles for optical biosensor applications. The position is funded by the Momentum Program of Hungarian Academy of Sciences.

Our research group has recently developed a portable device for the magneto-optical diagnosis of malaria [1, 2]. The device has been tested using malaria parasite cultures and mouse models. The Applicant will be involved in the engineering/optimization of a new prototype of the device, in laboratory tests of new antimalarial drugs and possible field studies planned in Gabon and Thailand.

As an alternative subject, the Applicant can participate in the development of magnetoelectric metamaterials for optical biosensor applications. The aim of this project is to apply the directional-light-switch concept, recently observed in multiferroic materials [3, 4], for the enantioselective detection of chiral molecules such as proteins and viruses using magnetoelectric metamaterials. New nanomagnet composites are also under development aiming at the study of protein-protein interactions [5].

Qualifications: An MSc degree in physics, biology, medical sciences or any of the related areas is required.

Application Instructions: Interested candidates should send a cover letter detailing qualifications, research interests, technical expertise and CV with two references to Dr. I. Kézsmárki (kezsmark@dept.phy.bme.hu) and Dr. S. Bordács (bordacs.sandor@wigner.bme.hu) till the 15th of September, 2014.

- [1] Á. Butykai et al. *Malaria pigment crystals as magnetic micro-rotors: key for high-sensitivity diagnosis* Scientific Reports **3**, 1431 (2013).
- [2] Á. Orbán et al. *Evaluation of a Novel Magneto-Optical Method for the Detection of Malaria Parasites* PlosONE **9**, 96981 (2014).
- [3] I. Kézsmárki et al. *One-way Transparency of Four-coloured Spin-wave Excitations in Multiferroic Materials* Nature Communications **5**, 3203 (2014).
- [4] S. Bordács et al. *Chirality of matter shows up via spin excitations* Nature Physics **8**, 734 (2012).
- [5] G. Ceolin et al. *Electrochemical template synthesis of protein-imprinted magnetic polymer microrods* Journal of Materials Science **48**, 5209 (2013).