

Technical University Berlin

Institute of Optics and Atomic Physics

AG Laserspectroscopy

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PhD position in Natural Sciences specializing in Physics: Surface-enhanced Raman sensor development for marine environmental applications

Within the framework of the European Community Initial Training Network *SENSEnet* (www.eu-sensenet.net)

, we are seeking candidates for a PhD position with a background in experimental physics (diploma or master) or with knowledge in analytical chemistry, marine chemistry or sensor

development in environmental science and technology.

The project aims to develop and test *in-situ* surface-enhanced Raman spectroscopy (SERS) instrumentation. One task focuses on the development and characterization of SERS active substrates and the other task is to build an underwater-system with improved laser and detection technology for long-term deployment. The system will be tested and deployed in cooperation with *SENSEnet* partners.

Based on the extensive experience of the laser spectroscopy group in marine research, the candidate will be enabled to apply recently developed microsystem laser sources for new *in-situ* Raman techniques in different spectral regions. This will allow the detection of e.g. organic pollutants in seawater with previously unmatched precision and sensitivity to be tested and verified. Moreover, novel detection approaches like using long optical fibers (length of several kilometers) for deep-sea investigations e.g. on the seafloor were recently applied at TU Berlin in preliminary tests and show great potential for further research. For more details see also:

Shifted excitation resonance Raman difference spectroscopy using a microsystem light source at 488 nm M. Maiwald, K. Sowoidnich, H. Schmidt, B. Sumpf, G. Erbert, H.-D. Kronfeldt (M.S. Kim, Shu-I Tu, K. Chao, eds) *Advanced Environmental, Chemical, and Biological Sensing Technologies VII*, **767**
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Proceedings of SPIE, (2010)

Investigations for real-time Raman measurements in the deep-ocean by applying a 1.5 W BA DFB diode laser and long optical fibers H.-D. Kronfeldt, M. Maiwald, H. Ahmad, H. Schmidt, K. Wohlfart, B. Sumpf, A. Klehr, G. Erbert (M.S. Kim, Shu-I Tu, K. Chao, eds) *Advanced Environmental, Chemical, and Biological Sensing Technologies VII*, **7673**
, Proceedings of SPIE, (2010)

Microsystem 671 nm light source for shifted excitation Raman difference spectroscopy M. Maiwald, H. Schmidt, B. Sumpf, G. Erbert, H.-D. Kronfeldt, G. Tränkle, *Applied Optics*, **48**
, Issue 15, 2789 - 2792 (2009)

The Use of Surface-Enhanced Raman Scattering for Detection of Organic Pollutants in Coastal Waters J. Pfannkuche, *PhD thesis, Polish Academy of Sciences (2009)*

Rapid shifted excitation Raman difference spectroscopy with a distributed feedback diode laser emitting at 785 nm, M. Maiwald, G. Erbert, A. Klehr, H.-D. Kronfeldt, H. Schmidt, B. Sumpf, G. Tränkle, *Appl. Phys. B* **85**, 509 - 512 (2006)

See also: http://www.ioap.tu-berlin.de/menue/arbeitsgruppen/ag_kronfeldt/veroeffentlichungen/publikationen/

The successful candidate should be prepared for a transnational research stay in Germany and has to meet the conditions of the Marie Curie early stage research (ESR) fellowship.

The three-year grant is to be started as soon as possible. Enquiries and applications can be made to Dr. Heinz-Detlef Kronfeldt (kf@physik.tu-berlin.de).

http://www.ioap.tu-berlin.de/menue/arbeitsgruppen/ag_kronfeldt/