

NOMATEN Online Seminar

Time: 1 PM

Location: gotomeeting room - <https://meet.goto.com/NCBJmeetings/nomaten-seminar>

Seminar date: November 7th, 2023

Title: Laser and Optical Methods and their Development for Modern Innovative Technological Applications: from Civil Nuclear to Historical and Cultural Art Heritage

Speaker name: Dr. Alexandre Semerok

Speaker affiliation: French Alternative Energies and Atomic Energy Commission (CEA), France

Abstract: Modern science and technologies and their rapid intensive development are in search for innovative efficient methods in a wide range of their applications. Laser and optical methods may offer a numbers of attractive features, such as being contactless, remote, non-destructive, real time and in situ applicable. LANIE laboratory (CEA/DES/ISAS/DRMP/SPC) is known for its high quality expertise, knowledge and extensive experience in laser methods development and their multipurpose wide-range applications (civil nuclear, space, historical art heritage, etc). A number of laser and optical methods are under their intensive study, development, adjustment and improvement at LANIE-laboratory:

- Laser Induced Breakdown Spectroscopy (LIBS) for surface elemental and isotopic analyses;
- Surface decontamination by laser ablation and heating for nuclear purposes and ITER;
- Modulated Photothermal Radiometry for rapid non-destructive control and testing, etc.

The results of our studies on the above methods and their wide-range applications will be presented and discussed.

Bio: Alexandre Semerok, Doctor of Sciences, PhD, Engineer, CEA Scientific Director/International Expert, has extensive experience and high professional qualifications in laser science and physical-chemical features of different materials under laser irradiation, in particular. Since 1990, his experimental and theoretical research studies on laser beam/matter interaction in CEA, Saclay, France have been focused mainly on laser methods development in a wide range of their applications (LIBS, surface cleaning and processing, near-field laser nano-ablation for surface elemental and isotopic cartography, etc.) to satisfy various complex demands of civil nuclear science and technologies. Currently, the particular scientific research interest is focused on Modulated Photothermal Radiometry method (RPM), its further development and specific applicability for remote, in situ, 3D non-destructive near real-time characterisation (non-homogeneities, cracks, deposited layer thickness and thermal resistance, thermal diffusivity, etc.) for civil nuclear and ITER technologies, and for preservation/restoration of historical and art heritage objects/artifacts as well. At present, RPM method studies are made within the frames of "ESPADON", the French ANR project, in cooperation with Fondation des Sciences du Patrimoine (FSP) and different scientific Institutions and Universities laboratories.