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A new approach to the diagnosis of cervical, oesophageal and prostate cancer based on a combination of infrared and terahertz techniques

This lecture will describe a recently funded program designed to advance the diagnosis of cervical, oesophageal and prostate cancers through the application of infrared, Raman and terahertz techniques. The programme will also clarify the potential of these techniques for the characterisation of cancerous tissue since conventional approaches appear to have reached the limit of their predictivity and none of these promising techniques have reached the stage of clinical trials. A key role is played by the 4th generation light source, ALICE, at the Daresbury laboratory in the UK that has unique capabilities for research in this field. Research using the infrared free electron laser driven by ALICE has already lead to a novel technique with the potential to diagnose adenocarcinoma from tissue extracted by endoscopy from patients with the precursor condition Barretts oesophagus. The programme will also progress the development of two portable terahertz instruments, of novel design, with the potential for use in cancer diagnosis and explore the use of terahertz radiation as a new therapy for cancer.

Biography

Peter Weightman is an experimental physicist with a track record in developing novel instruments. He was a co-applicant on the proposal to construct the ALICE machine which is an energy recovery linear accelerator, the first of its kind in Europe and the only one in the world equipped with a terahertz beamline designed for studies of cancer. ALICE is now operational and he is leading a collaborative programme involving academic scientists and clinicians in exploiting the potential of ALICE for cancer research.

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