Dee Memorial Lecture

Kelvin Building
Lecture theatre 312
Wednesday 19 October 2005 at 5.00pm

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University of St Andrews,
Chairman of the Scottish Scientific Advisory Committee

The Femtosecond Revolution: exploitation of ultrafast photonics in science and technology

When the original ruby laser was first demonstrated in 1960 by Maiman at the Hughes Aircraft Corporation it was heralded as an exceptional source of intense coherent light. The technique of laser mode locking which dates back to 1966 then illustrated a scheme whereby very short impulses of light could possess yet higher levels of peak intensity. During the intervening four decades there has been impressive and steady progress in the development of practical and versatile lasers from which pulses as short as a few femtoseconds can be produced directly and reliably. These lasers have laid a foundation for the field of ultrafast photonics that continues to offer new insights into fundamental science as well as an impressive and varied range of applications that are making femto-technology much more of a reality.

In this presentation I will review briefly how lasers can be designed to produce femtosecond optical pulses and some representative applications will be used to illustrate selected aspects of ultrafast science and technology. My aim will be to show that this area of research, which might have previously been regarded as somewhat esoteric, is now reaching out to engage a growing number and variety of scientists, engineers and technologists. This is therefore a welcome revolution and one that that undoubtedly has a considerable way to go.

As a backdrop to research in this area I will also relate some of this work in photonics to the context of science more generally in Scotland. Specifically, I plan to comment on the opportunities and challenges arising from recent initiatives such as the funding of the Scottish Universities Physics Alliance and to some aspects of knowledge transfer and innovation.

Tea will be provided from 16.30 in room 470, Kelvin Building.
Following the lecture there will be a reception.