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The Department of Automatic Control & Systems Engineering  
is pleased to announce the following seminar:

## **Analysis and Design of Electron Beam Orbit Controllers for Synchrotrons**

***Speaker: Professor Stephen Duncan***

*Department of Engineering Science,  
The University of Oxford*

**Wednesday, 27 February 2013 at 14:00**

**Location: Sir Henry Stephenson Building, Lecture Theatre LT02**

### **ABSTRACT**

There are over forty synchrotrons and fourth generation light sources around the world, which accelerate electrons to relativistic speeds in order to generate synchrotron radiation for academic and industry research. The high brilliance of the photon beams produced by these machines is achieved by reducing the beam emittance in both the horizontal and vertical planes. This leads to requirements on the stability of the electron beam, which is a crucial parameter for light sources. A feedback system is used to stabilise the electron beam when subjected to disturbances from environmental effects. This talk describes the design of a feedback control system for electron beam stability at Diamond Light Source, the UK's national synchrotron facility. The Diamond controller uses 172 horizontal and 172 vertical corrector magnets to correct the electron beam position at a rate of 10kHz in order to reduce beam movement to within 10% of the b which corresponds to a requirement for sub-micron accuracy for 1 location of the electron beam.



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