

## Foreword

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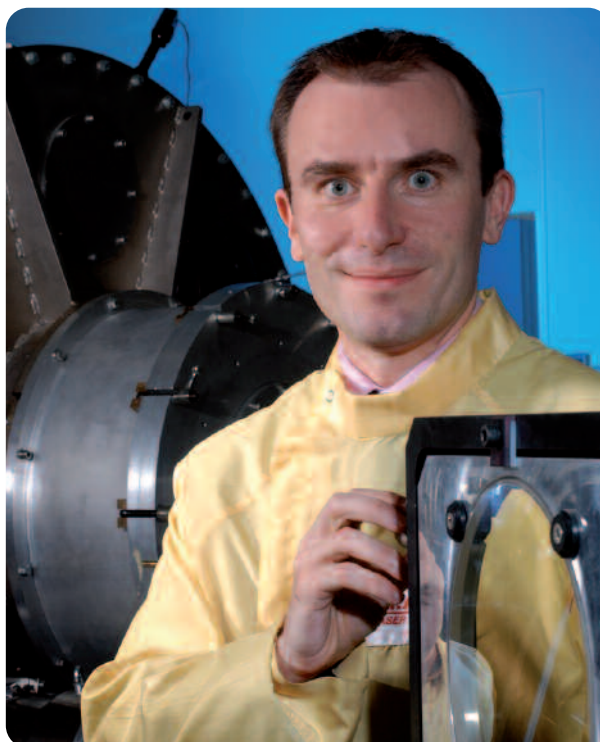
This annual report for the Central Laser Facility (CLF) at the STFC Rutherford Appleton Laboratory provides highlights of the scientific research which has been carried out by users of the Facility and its staff over the financial year 2006-07.

The research of the CLF covers a wide range of disciplines across physics, chemistry and biology as well as the development of the facilities themselves and the associated theory and instrumentation. The laser systems involved span a wide range of characteristics and include short pulse high repetition rate systems with wide tuning range, to ultra-high power lasers which are capable of producing extremely high intensities and are used for fundamental studies and applications in plasma physics.

We are at a time where many of our facilities are undergoing significant upgrades. This report details progress in many of these – from a 10 Petawatt upgrade to Vulcan, to the commissioning of Astra-Gemini, to the instigation of new projects in ultrafast science and the applications of Raman and Infra-Red spectroscopy.

We have also embarked on two major European projects – ELI and HiPER, which will transform our high power laser field over the coming years. These developments are incredibly exciting in that we are securing a strong future for leading-edge science, whilst addressing some of the most compelling societal priorities. However, such developments inevitably lead to pressures on the delivery to our user community of existing facilities. We believe we have struck a healthy balance, but as always would be very interested to hear your opinions on how we can improve.

It is increasingly recognised that the real-world, near-term applications of our science programme need to be nurtured and communicated – both within our community and to the wider public. It is important that we demonstrate that our research is of an internationally leading standard and also has a strong impact on our economic prosperity and quality of life. As such, I am pleased to note a series of exciting new applications that have grown from our fundamental science programme – ranging from the detection of counterfeit drugs, to new non-invasive diagnostics for oncology, techniques for quality control in pharmaceutical production lines, and longer term studies of clean energy sources.



The high level of demand for access to the CLF both from UK and international scientists continues greatly to exceed the time available for the scheduling of experiments. The standard of the research presented in this report is first rate, demonstrating once again the internationally leading position of the CLF and its user community.

Finally, I would like to record my sincere appreciation to the CLF staff for their outstanding effort, enthusiasm and commitment over the past year.

**Mike Dunne**