

平成 29 年度

第 3 回 先端エネルギー理工学セミナーのお知らせ

Seminar on Advanced Energy Engineering Science

下記のとおり、先端エネルギー理工学セミナーを開催致します。通常通り単位取得の一環になりますので、奮って参加いただきますよう、ご案内申し上げます。

記

対 象： 学部・大学院学生（修士、博士）および教職員

日 時： 2017 年 6 月 9 日（金）14:50～16:10

場 所： 総理工 H 棟 2 階講義室

講演者： Nicholas Dover 博士（JSPS 特別研究員）

量子科学技術研究開発機構 量子科学研究部 関西光科学研究所

講演題目： A brief introduction to high intensity laser plasma interactions and accelerators

アブストラクト：

Modern high power lasers can reach peak powers above 1 petawatt ($1 \text{ PW} = 10^{15} \text{ W}$), approximately 1 million times the instantaneous total output of a typical power station ($\sim \text{GW}$), albeit for a very, very short time ($\sim 10^{-14} - 10^{-12} \text{ s}$). At the same time, these laser pulses can be focused down to a spot smaller than a human hair. This tight spatial confinement of laser energy results in incredibly high energy density at the focus. Matter placed here can therefore reach extreme conditions unattainable by any other means on earth. Electrons are quickly stripped from ions, and due to their high charge-to-mass ratio are rapidly accelerated by the huge electromagnetic fields of the focused laser, reaching relativistic energies within less than $1 \mu\text{m}$. One application of this is rapid spatial separation of electrons and ions, which can itself generate large electrostatic fields dwarfing those that can be generated by, for example, accelerating cavities in particle accelerators. These interactions can therefore be used to miniaturise accelerators, and can produce accelerated beams difficult to achieve by conventional means.

In this seminar, I will give an introduction to some of the fundamental concepts which underpin the interaction of high intensity lasers with plasma, and an overview of the different research areas enabled by high power laser technology. I will then describe the principles of laser-plasma accelerators, current state-of-the-art research and outlook and challenges for the future, with a particular focus on laser-plasma ion sources, which is my principle research theme.

Finally, I will briefly discuss education and current research themes in physical and plasma science in universities in the United Kingdom, and give a short perspective on the opportunities and challenges of working in a highly international and competitive research area as a young scientist.

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【単位認定について】 先端エネルギー理工学特別講義 第二<M3902>の単位として認定されます。*

先端エネルギー理工学セミナー (Seminar on Advanced Energy Engineering Science) はバウチャー制を採用しており、7 回 当セミナーを受講した学生には 1 単位が認定されることになっています。先端エネルギー理工学専攻の学生はもちろん、先端エネルギー理工学専攻以外の学生諸君も是非聴講して下さい。

※セミナーが英語で行われる場合は先端エネルギー理工学特別講義 第一<M3901>も対象となります。