

Short Pulse Laser Plasma Interactions

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Short Pulse Laser Plasma Interactions

Research Areas. Plasma and Ultrafast Physics Group (PUPG) High-Energy-Density Physics (HEDP) Experiments Group; Integrated Modeling Group; Plasma Theory Group

Short-Pulse Underdense Laser-Plasma Interactions ...

short-pulse lasers interact with ionized matter, and to review the areas in which this new interaction physics is already being put to practical use in other fields. In so doing, we shall restrict ourselves to laser-plasma interaction and we shall not attempt to cover the related

Short-pulse laser - plasma interactions

This thesis deals with several theoretical aspects of the interaction of an intense femtosecond laser pulse with a plasma. A mechanism for the enhancement of the collisional absorption of light at high intensities is described, involving the direct excitation of collective modes of the plasma, and the importance of this mechanism for a solid-density laser-produced plasma is studied under a range of conditions.

Short-Pulse Laser-Plasma Interactions - NASA/ADS

Recent theoretical and experimental research with short-pulse, high-intensity lasers is surveyed with particular emphasis on new physical processes that occur in interactions with low- and high-density plasmas.

Short-pulse laser - plasma interactions - IOPscience

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Short Pulse Laser Plasma Interactions - gamma-ic.com

Abstract Unipolar arcing has been shown to be the primary plasma-surface interaction process when a laser produced plasma is in contact with a surface. Evidence of unipolar arcing was found on targets irradiated with neodymium laser pulses of 5 ns duration.

Short-pulse laser and plasma surface interactions ...

Short Pulse Laser Interactions With Matter 2nd Edition by Paul Gibbon (Author) ISBN-13: 978-1848168657. ISBN-10: 1848168659. Why is ISBN important? ISBN ... giving way to a host of exotic physical effects such as multiphoton ionization, particle acceleration by plasma waves, relativistic self-channeling and high harmonic generation. These ...

Short Pulse Laser Interactions With Matter: Gibbon, Paul ...

Short pulse laser train for laser plasma interaction experiments. Kline JL(1), Shimada T, Johnson RP, Montgomery DS, Hegelich BM, Esquibel DM, Flipppo KA, Gonzales RP, Hurry TR, Reid SL. Author information: (1)Los Alamos National Laboratory, Los Alamos, NM 87545, USA.

Short pulse laser train for laser plasma interaction ...

Short-pulse laser and plasma surface interactions - NASA/ADS. Unipolar arcing has been shown to be the primary plasma surface interaction process when a laser produced plasma is in contact with a surface. Evidence of unipolar arcing was found on targets irradiated with neodymium laser pulses of 5 ns duration. The burn pattern of a defocused low irradiance laser pulse consists exclusively of unipolar arc craters.

Short-pulse laser and plasma surface interactions - NASA/ADS

The generation of harmonics by interaction of an ultrashort laser pulse with a step boundary of a plane overdense plasma layer is studied at intensities $I \lambda^2 = 10^{17} - 10^{19} \text{ W cm}^{-2} \mu\text{m}^2$ for normal and oblique incidence and different polarizations.

Short-pulse laser harmonics from oscillating plasma ...

plasma. The further interaction of the laser pulse with the heated matter induces a large variety of phenomena which depends on the laser intensity and the target. In a solid target irradiated by a laser pulse in a non-relativistic regime (electron quiver velocity is much smaller than the speed of light) processes like fast evaporation, 1

Ultrashort laser pulse interaction with overdense plasmas

The interaction of the laser with plasma electrons around critical density, is amenable to standard explicit Particle In Cell (PIC) methods where the computational requirement is to well resolve the laser wavelength. These models can simulate the momentum spectrum of accelerated electrons and its variation with intensity, spot size, density scale length and angle of incidence.

Modelling short pulse, high intensity laser plasma ...

This book comprises the specification and description of two experiments which were carried out to research the interaction of high intensity, ultra-short laser pulses with matter. In the first experiment, the ionization front and the plasma channel generated by laser pulses of sub-10-fs duration and gigawatt power were studied using optical ...

Amazon.com: Laser-plasma Interaction with Ultra-short ...

Aims to represent a comprehensive treatment of the subject, covering the theoretical principles, experimental status, and applications of short-pulse laser-matter interactions. This book looks at the physical phenomena, which arise as a result of this form of "light-matter" interaction.

Short pulse laser interactions with matter : an ...

This includes the propagation, self-focusing, and guiding of laser pulses in uniform plasmas and plasmas with preformed density channels. Instabilities relevant to intense short-pulse laser-plasma interactions, such as Raman, self-modulation, and hose instabilities, are discussed. Recent experimental results are summarized.

Physics of Laser-Driven Plasma-Based Accelerators

At short and ultra-short laser pulse durations, because the laser interacts with materials due to very quick excitation of the electron distribution, electron-electron coupling leads to a rapid rise in the electron temperature, followed by lattice heating "at a rate dependent upon the electron-phonon coupling strength, and eventual vaporisation of the transiently heated target".

Effects of Different Laser Pulse Regimes (Nanosecond ...

Short laser pulse formation was demonstrated using graphene (reduced graphene oxide to be precise) as a saturable absorber in a high-energy management regime. 37, 38 To guarantee the safe and robust operation of graphene overcoming optical power-induced thermal damage, an evanescent field interaction scheme of propagating light with graphene ...

Laser Pulse - an overview | ScienceDirect Topics

The group pioneered the development and use of parallel PIC simulations for short pulse laser and beam plasma interactions, for the moving window technique for plasma based acceleration, for

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three dimensional quasi-static PIC techniques, and for the use of ponderomotive guiding center techniques in PIC codes.

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