

# Nuclear physics with lasers

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Abstract :

The development of high intensity lasers has opened up new opportunities for nuclear physics studies in extreme conditions which cannot be reached with conventional particle accelerators. Nuclear properties in presence of very high electromagnetic fields, nuclear reaction rates in hot and dense plasmas are examples of such new domains of investigation.

UHI lasers are unique tools to produce hot and dense plasmas, very high fluxes of photon or particle beams in very short duration pulses and very high electromagnetic fields. All these aspects are of great interest for fundamental nuclear physics studies.

The presentation will consist in three sections:

The first part will be devoted to a brief description of the latest challenges in nuclear physics studies and the corresponding main goals in terms of beam and detection apparatus developments.

The second part will present the interest of UHI lasers for nuclear physics studies: The use of UHI lasers to produce accelerated particle beams, plasma and high electromagnetic fields will be discussed.

The third part of the presentation will be devoted to the detector developments required for nuclear physics studies at laser facilities.