**Shock Ignition Approach (Bold Times New Roman in 16pt)**

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(Times New Roman in 12pt) Very large laser facilities are currently used to study the process of inertial confinement (ICF) fusion and the possibility of igniting thermonuclear targets. These include the NIF (National Ignition Facility) at the Lawrence Livermore National Laboratory in the US, the LMJ (Laser Megajoule) at the CEA site of Le Barp near Bordeaux, or the Shenguang-III laser facility in China.

Nevertheless, despite un-doubtful and huge progresses, the goal of achieving ignition has not been reached yet.

The talk will introduce the recent progress in ICF, highlight the main problems towards ignition, and finally addressing the recent “Shock Ignition” approach to ICF, which provides a promising pathway ahead.

This approach relies on the separation of the compression and ignition phases. Compression is realized with laser beams of several ns duration at “conventional” intensity (a few times 1014 W/cm2). Ignition will be instead triggered by using a sub-ns high intensity laser spike (up to 1016 W/cm2) which irradiates the target at the end of phase, generating a very strong spherical shock converging in the center and proving the temperature increase needed to trigger fusion reaction.

The implosion phase takes place with relatively thick targets and at relatively low velocity, thereby minimizing the impact of hydrodynamic instabilities (Rayleigh-Taylor). As for the final phase, it is crucial to be able of generating very strong shocks (at least 300 Mbar at the ablation surface).

In order to assess the feasibility of shock ignition we are trying to answer several physical questions like

- the impact of parametric instabilities (SRS, SBS, TPD) in this interaction regime

- the generation of hot electrons and their effects on hydrodynamics

- the capability of really producing such strong shocks

- the possibility of driving uniform implosions in direct drive by minimizing the impact of laser non-uniformities.

**Keywords:** Inertial fusion; Shock ignition; Plasma diagnostics(Times New Roman in 12pt)

Note: Usually, abstract should not exceed one page.