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Laser-driven inertial confinement fusion (ICF): principles, status
and perspective for energy production after the achievement of ignition at the NIF

On December 5, 2022, thermonuclear ignition of a deuterium-tritium mixture was demonstrated in an ICF experiment at the NIF laser (Lawrence Livermore National Laboratory). This result aroused great interest even outside the scientific community, and generated great expectations on future production of electrical energy by “inertial fusion energy (IFE)”.

In this talk, I will first introduce the principles of ICF by laser-driven spherical implosion, the relevant ignition conditions, as well as the main physics issues. I will then report on the experimental progress culminating in the achievement of ignition.

Finally, I will present my personal view on the future of ICF, and the long, difficult, but exciting path towards IFE.