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A new concept of inertial magnetic confinement fusion with the ultra-intense laser system KENJIRO TAKAHASHI, JWRI, Osaka University — We will present a new magnetic field machine generating strong magnetic field using by ultra-intense laser system and suggest a new concept of the fusion research with this system. High energy electron generation with the interaction of the solid target and short pulse laser is well-known phenomena. This hot electron jet produces high-intense magnetic field which surround the electron jet axis. Four laser beams separated with the beam splitters from one beam irradiate four solid targets at the same time, and four electron jets shaping small square product a uniform and strong magnetic field at the center of the square modeled on a single-turn coil driven by the hot electron. Furthermore, a same coil is produced by more four laser beams, and the two coils set on parallel to each other make a Helmholtz coil. Setting a thin metal liner on the center of the Helmholtz coil and implosion of the cavity in which a seed magnetic field driven by the Helmholtz coil with long pulse laser for ICF research compresses stronger magnetic field in the cavity. This system could generate extremely high-intense magnetic field. Such a strong magnetic field confines dense plasma of the fusion fuel. It is a new research concept of inertial magnetic confinement fusion.

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