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Continuous conic imploding magneto-inertial fusion YIAN LEI, School of Physics, Beijing University — Magneto-inertial fusion (MIF) compresses a magnetized plasma target, combining the features of both magnetic confinement fusion (MCF) and inertial confinement fusion (ICF). We proposed a new MIF scheme in which the fusion fuel is continuously compressed by a large ratio conic implosion, as the fuel has been compressed to about a millionth of its original volume (about 1 cubic centimeter), the temperature rises to a few electron-volts and pre-ionized, a small single turn coil (STC) at the cone top then discharges to produce a very strong magnetic field in the fusion fuel, the discharge will magnetize the plasma and create a field reversed configuration (FRC) or theta-pinch in the plasma, as the compression goes on, the magnetized plasma will be further compressed to fusion burn. The implosion happens inside a solid cone coated or wetted by lead-bismuth (Pb-Bi) eutectic alloy (LBE). LBE is driven by high pressure air into the conic chamber to compress the very thin fuel. To minimize the amount of impurities in the fuel, the cone is pre-filled by LBE and a small fuel bubble is put in, then LBE sinks to bottom to create a large volume (about 1 cubic meter) and very thin bubble. This approach does not require artificial pre-ionization; the compression is continuous and accelerating because of the conic shape; a small sized STC producing high magnetic field is also a known technology. All these features should make the approach promising.

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