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**Magnetic Flux Compression in Plasmas**[1]

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Magnetic flux compression (MFC) as a method for producing ultra-high pulsed magnetic fields had been originated in the 1950s by Sakharov et al. at Arzamas in the USSR (now VNIIEF, Russia) and by Fowler et al. at Los Alamos in the US. The highest magnetic field produced by explosively driven MFC generator, 28 MG, was reported by Boyko et al. of VNIIEF. The idea of using MFC to increase the magnetic field in a magnetically confined plasma to 3-10 MG, relaxing the strict requirements on the plasma density and Lawson time, gave rise to the research area known as MTF in the US and MAGO in Russia. To make a difference in ICF, a magnetic field of $\sim$100 MG should be generated via MFC by a plasma liner as a part of the capsule compression scenario on a laser or pulsed power facility. This approach was first suggested in mid-1980s by Liberman and Velikovich in the USSR and Felber in the US. It has not been obvious from the start that it could work at all, given that so many mechanisms exist for anomalously fast penetration of magnetic field through plasma. And yet, many experiments stimulated by this proposal since 1986, mostly using pulsed-power drivers, demonstrated reasonably good flux compression up to $\sim$42 MG, although diagnostics of magnetic fields of such magnitude in HED plasmas is still problematic. The new interest of MFC in plasmas emerged with the advancement of new drivers, diagnostic methods and simulation tools. Experiments on MFC in a deuterium plasma filling a cylindrical plastic liner imploded by OMEGA laser beam led by Knauer, Betti et al. at LLE produced peak fields of 36 MG. The novel MagLIF approach to low-cost, high-efficiency ICF pursued by Herrmann, Slutz, Vesey et al. at Sandia involves pulsed-power-driven MFC to a peak field of $\sim$130 MG in a DT plasma. A review of the progress, current status and future prospects of MFC in plasmas is presented.

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