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Fueling and Momentum Injection into the STOR-M tokamak (I)

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In a magnetically confined fusion reactor, the density and the temperature profiles are highly peaked at the core of the reactor and the fusion reactions occur mostly at the center. Unlike the fission reactors with the fuel bundle inserted in the reactor core, the fusion fuels have to be continuously injected from the outside to maintain the desired density in the reactor. The primary objective of the study of compact torus injector at the University of Saskatchewan is to investigate the feasibility of direct central fueling of a tokamak by CT injection and to study its effects on the tokamak discharge in our STOR-M tokamak, the only operating tokamak in Canada today. Compact torus is formed in a magnetized coaxial gun and is confined by the magnetic field self-induced by the current in CT. CTs can be accelerated to velocities 1-2 orders of magnitude higher than the fuel velocities currently achievable by any other fuel delivery technologies. In addition, CTs can be formed only one at a time. To maintain steady-state operation of a fusion reactor, repetitive CT operation is needed. In this talk, recent experimental results on repetitive and reproducible CT operation and momentum injection into the STOR-M tokamak by CT injection will be presented.

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