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ICC/1-1Rb: Flow and Magnetic Field Profiles in the HIST Spherical Torus Plasmas Sustained by Double Pulsing Coaxial Helicity Injection

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The double pulsing Coaxial Helicity Injection (CHI) on HIST has regenerated toroidal currents up to 80 kA against resistive decay. The internal magnetic field measurements have verified the flux amplification and the formation of the closed flux surfaces after the second CHI pulse. The poloidal flux increases proportionally with the toroidal current as increasing the toroidal field coil current. We have studied characteristics of the plasma flow and the magnetic field structures during the sustainment. The observed poloidal shear flow could be explained in terms of the ion diamagnetic drift that is responsible for the steep density gradient between the central open flux column and the closed flux region. These results are confirmed with help of 3D-MHD computational simulation.

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