Abstract Submitted
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Inductive helicity injector operations with a driving frequency from 14.5 to 68.5 kHz[1] B.S. VICTOR, C. AKCAY, C.J. HANSEN, A.C. HOSSACK, T.R. JARBOE, K.D. MORGAN, B.A. NELSON, University of Washington — The HIT-SI program investigates the formation and sustainment of toroidal current in a simply connected confinement volume of major radius 0.5 m through inductive helicity injection. Modifying the injector circuits has allowed operations at 14.5, 36.8, 53.5 and 68.5 kHz. The injector flux circuits are controlled with a PID feedback algorithm. Peak current amplification has reached 3.9 at the higher frequencies. A set of metrics has been developed using biorthogonal decomposition (BD) to efficiently compare simulations to experimental measurements. On HIT-SI, the BD is performed on the 123 surface poloidal and toroidal magnetic probes. Synthetic probes at the same locations are used for analysis of the NIMROD simulated data. First BD is performed on the experimental shots and simulations to find the total magnetic energy measured by the probes for each data set. The spatial modes from the BD of a reference shot are then used to decompose the other experimental and simulated data. This provides a comparison of the spatial alignment and frequency content of all other data sets to the reference shot. Analysis of these results gives a measure of the validity of the simulations.

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B.S. Victor
University of Washingtion

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