

Abstract Submitted
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NIMROD Modeling of HIT-SI and HIT-SI3¹ KYLE MORGAN, TOM JARBOE, AARON HOSSACK, University of Washington — The HIT-SI and HIT-SI3 devices are spheromaks formed and sustained via a set of Steady Inductive Helicity Injectors (SIHI) that are operated in AC. The experiment explores the formation and sustain of stable spheromaks with a variety of perturbation mode structures. The HIT-SI device consisted of two injectors with primarily $n = 1$ toroidal symmetry while the HIT-SI3 device has three injectors capable of a mixture of $n = 1$ and $n = 2$ perturbations or a primarily $n = 3$ perturbation, depending on the relative phase of the injectors. Using the NIMROD code to model these devices, we are able to validate with experimental results (previously only done on HIT-SI) and examine the interaction between the injectors and the spheromak. Simulations are performed with both finite and zero- β models to gain an understanding of the thermal properties of the device. Additionally, a set of extrapolation simulations has been performed illustrating the spontaneous formation of closed flux surfaces at high current amplification.

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Kyle Morgan
University of Washington

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