Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Development of Continuous Plasma Merging Scenario for Start-up and Formation of Spherical Tokamak Plasmas CHOONGKI SUNG, Y.S. PARK, HYUNYEONG LEE, J. KANG, Y.S. HWANG — A new device which can start-up and sustain ST plasmas by means of continuous tokamak plasma injection has been designed. The device with two separated solenoids at both ends has been designed to generate small plasmas inductively, and then the plasmas are merged to the middle region, where main ST plasmas are formed. If the ST plasma could be sustained while two separated solenoids are recharged subsequent injections of inductively formed plasmas from partial solenoids can maintain or increase plasma currents. To make a feasible operation scenario of the device, a circuit model combined with density and power balance equations is developed. In the model, plasma is assumed to be a single filament in a circuit, and evolution of circuit plasma parameters can be evaluated from balance equations. By using the model, an operational scenario utilizing continuous plasma injections from AC operations of partial solenoids is developed to overcome the ST's weakness. Experimental verification of the operation will be demonstrated in near future.

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Date submitted: 24 Jul 2009 Electronic form version 1.4