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Spherical tokamak plasma startup by use of a washer gun RY-OTA IMAZAWA, RYOSUKE MORII, MAKOTO NAKAGAWA, YASUSHI ONO, University of Tokyo — Startup without a center solenoid(CS) coil is an important subject for spherical tokamak(ST) plasmas due to their narrow center coil space. The new spherical tokamak device UTST in University of TOKYO was designed to form ultra high beta STs using their axial merging. The CS-less startup for each ST was studied by the toroidal electric field induced by external poloidal field(PF) coils. We used a seed of plasma made by a washer gun together with PF coil current whose frequency is a few kHz, in order to make low q and high density ST. The washer gun was installed on the bottom of the vacuum vessel of UTST. A fast piezo valve was used to feed the working gas to the gun. The gas flow from it was as small as 500sccm and discharge time of the gun was as short as 1~2ms. So the gun discharge started after gas was filled in the vacuum vessel. However a plasma from the gun was supplied to the bottom $1/3\sim 1/2$ of the total volume because of recombination process. A new fast solenoid valve is being installed. Using a video camera, we observed a spiral light line from the gun. The plasma light was observed in large region of vacuum vessel and now proceeded to rogowsky coil measurement during the plasma formation.

Ryota Imazawa
University of Tokyo

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