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**Pulsed High-Power Heating of Magnetic Reconnection for Spherical Torus Plasmas** YASUSHI ONO, University of Tokyo, MICHIAKI INOMOTO, TAKUMA YAMADA, TS AND UTST TEAM — The merging/ reconnection heating of spherical torus plasmas (ST, Spheromak, RFP, FRC) has been developed in the TS-3 TS-4 and UTST experiments, leading us to its new extension to their pulsed high-power heating. Two spherical torus plasmas were produced inductively by two or four PF coil currents without using any center solenoid (CS) and they were merged together for high-power reconnection heating. The reconnection outflow speed was observed to be equal to the Alfven speed under no guiding field condition. The outflow energy is converted mostly into ion thermal energy through ion viscosity and/or fast shock. This fact indicates that the ion temperature increment (and thermal energy) scales with squares of reconnecting magnetic field (Alfven speed). This unique method enables us to utilize the highest heating power MW-GW among all CS-less startups and the heating time much shorter than the energy confinement time and the electron-ion collision time. These facts indicate that the merging of two spherical torus plasmas possibly provides a direct path to the burning plasma formation. The TS-3 and TS-4 scaling data suggest that two merging spherical torus with B=1-3T, n=$10^{20}$m$^{-3}$ will increase its ion temperature into the ITER regime plasma of T≈20keV

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