Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

2D High-Resolution Measurement of High Guide-Field Magnetic Reconnection in TS-3U Spherical Tokamak Merging Experiment QINGHONG CAO, MOE AKIMITSU, ASUKA SAWADA, HIROSHI TANABE, YASUSHI ONO, the University of Tokyo — The TS-3U experiment performs magnetic reconnection with a strong guide field by merging two spherical tokamak plasmas. To observe the 2D configuration of the current sheet, we developed a high-resolution 2D magnetic probe array with 260 channels, arranged into 13x10 Bz components and 13x10 Br components, with up to 5 mm spatial resolution spread over a 40 cm x 30 cm poloidal area. The current density J_t , the electric field E_t, and the current sheets effective resistivity $\eta_{eff}(= \frac{E_t}{J_t})$ will therefore be followed during the reconnection process. Under a strong guide magnetic field, the sheet resistivity is expected to be almost classical because the sheet thickness is much larger than the ion gyroradius. But resistivity is observed to be anomalous with pileup and plasmoid formation appearing to regulate the reconnection speed. The anomalous increase in resistivity is being studied as a possible cause for the high power heating of fast magnetic reconnection.

Qinghong Cao
the University of Tokyo

Date submitted: 15 Sep 2017 Electronic form version 1.4