**Introduction**

**Abstract**

Fast localized CHERS measurements of ion flow velocity in the core of MST yield:

- Electric field and current profiles are determined.
- Correlated velocity fluctuations on the timescale of ion transit are recorded.
- Spatial structure of the velocity fluctuations is measured.
- The coherence is zero near the magnetic axis.
- Improved modeling of Ohm’s Law in MST is continuing.

**Magnetic Modes and Velocity Fluctuations**

- Ensemble Method

**Coherence of Fluctuating Ion Velocity and Magnetic Modes**

**Localized poloidal Velocity Fluctuation Profiles in Deuterium Plasmas**

**Doppler width**

- Correlated velocity fluctuations are recorded on the timescale of ion transit.
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**Magnetometer**

- A magnetometer provides ion flow velocity and magnetic field direction.
- Spatial structure of the velocity fluctuations is measured.
- The coherence is zero near the magnetic axis.
- Improved modeling of Ohm’s Law in MST is continuing.

**Summary**

Fast localized CHERS measurements of ion flow velocity in the core of MST yield:

- Electric field and current profiles are determined.
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**Localized MHD Dynamo measurement on Axis**

The MHD dynamo on the axis of MST has been calculated from the data.

**Coherent impurity velocity fluctuations are recorded on the timescale of ion transit.
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