Chromospheric Recurrent Jets in a Sunspot Group and Their Intergranular Origin — BBSO/GST high-resolution observations

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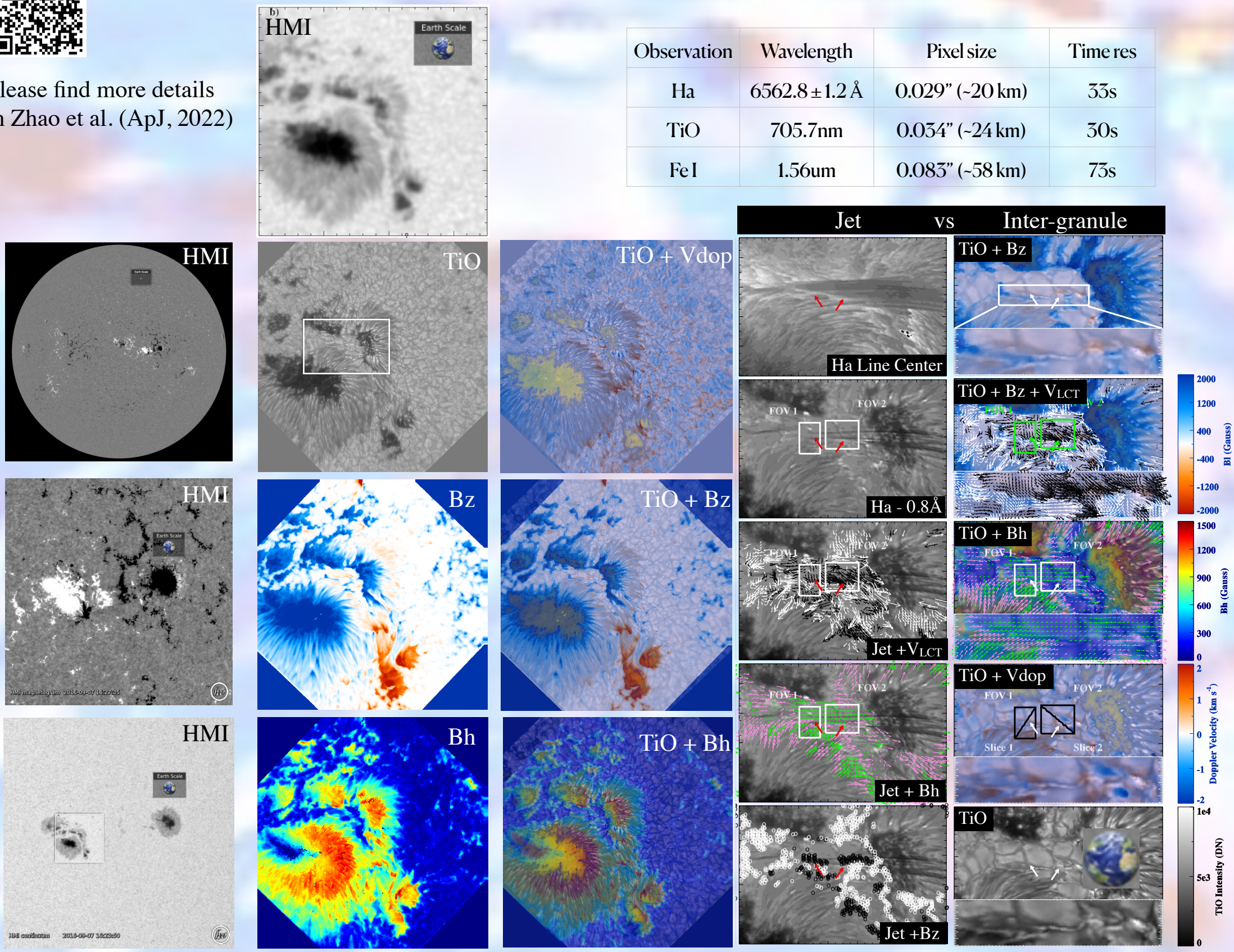
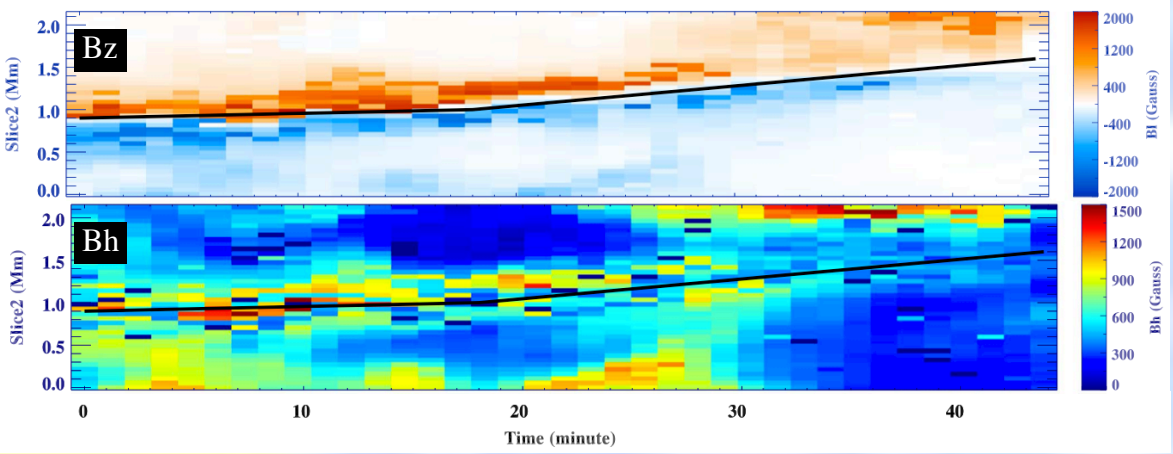
Please find more details in Zhao et al. (ApJ, 2022)

Observation	Wavelength	Pixel size	Time res
Ha	6562.8 ± 1.2 Å	0.029" (~20 km)	33s
TiO	705.7nm	0.034" (~24 km)	30s
Fe I	1.56um	0.083" (~58 km)	73s



Magnetic cancellation at the Inter-granular lanes and the enhancement of the horizontal field



Time-Distance Evolution acrossing the Intergranular Lanes

Method:

- Kinetics of Jet (see the chromosphere):

Doppler velocities of jet and its relevant root are derived by fitting the intensity profile vs. wavelength. Projected velocity was derived by fitting the time-distance image.

- Surface Velocity (see the movement at the photosphere):

LCT method is applied to the TiO image series to obtain the surface flow.

- Vector Magnetic Field (see the deep photosphere):

We did the ME inversion for the Stokes I,Q,U,V that is obtained by NIRIS. The magnetic field, azimuth, inclination, Doppler velocity, non-thermal line width are then derived. A minimum-energy approach is adopted to resolve the 180° ambiguity in the azimuth angle of the vector magnetic field.

Conclusions:

- All the kinetic features at the different layers through the photosphere and chromosphere favor a convection-driven reconnection scenario for the recurrent fan-like jets and evidence a site of reconnection between the photosphere and chromosphere corresponding to the inter-granular lanes.