

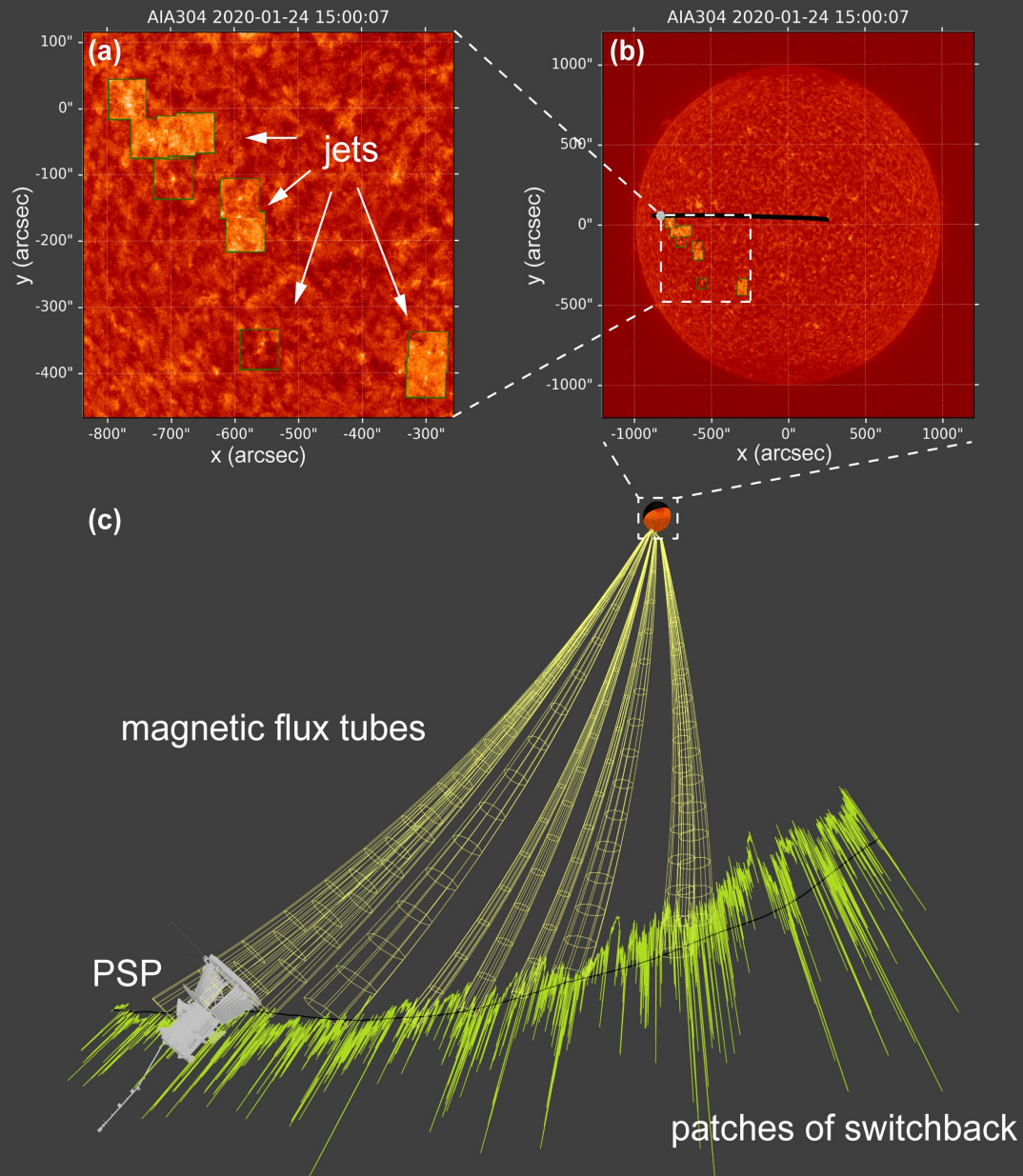
From Magnetic Reconnection at Chromospheric Network Boundaries to Switchbacks in the Inner Heliosphere

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and Yajie Chen¹

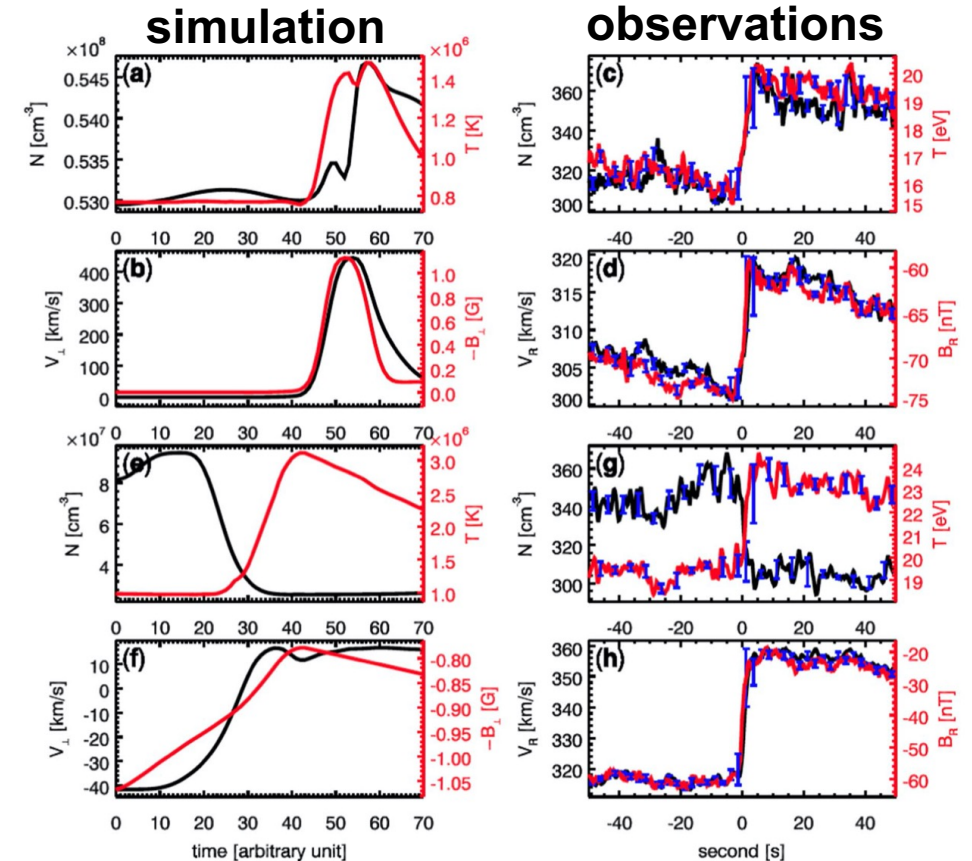
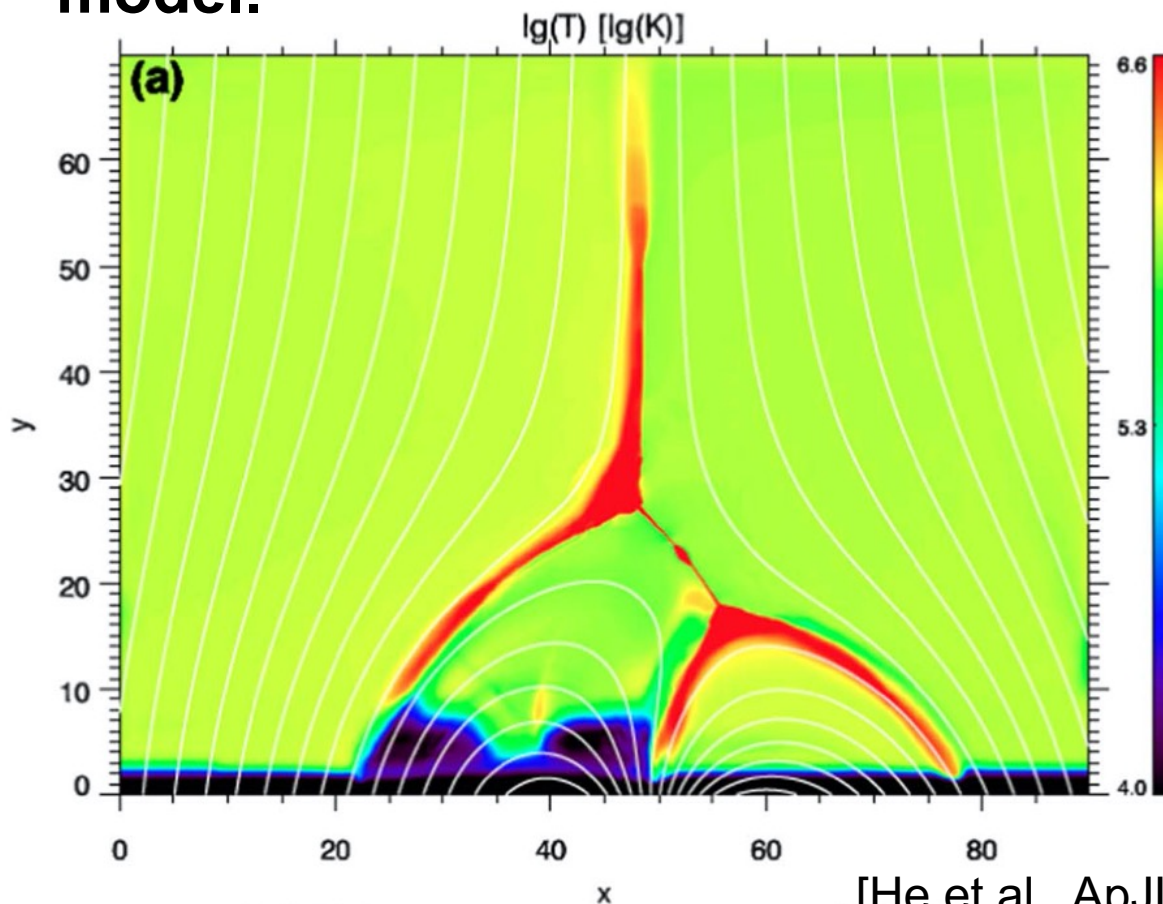
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- We focus on: **the position of the source of the switchbacks.**
- We analyze: **the relationship of small coronal jets observed by SDO/AIA and patches of switchback measured by PSP during 2020/01/24-01/27.**

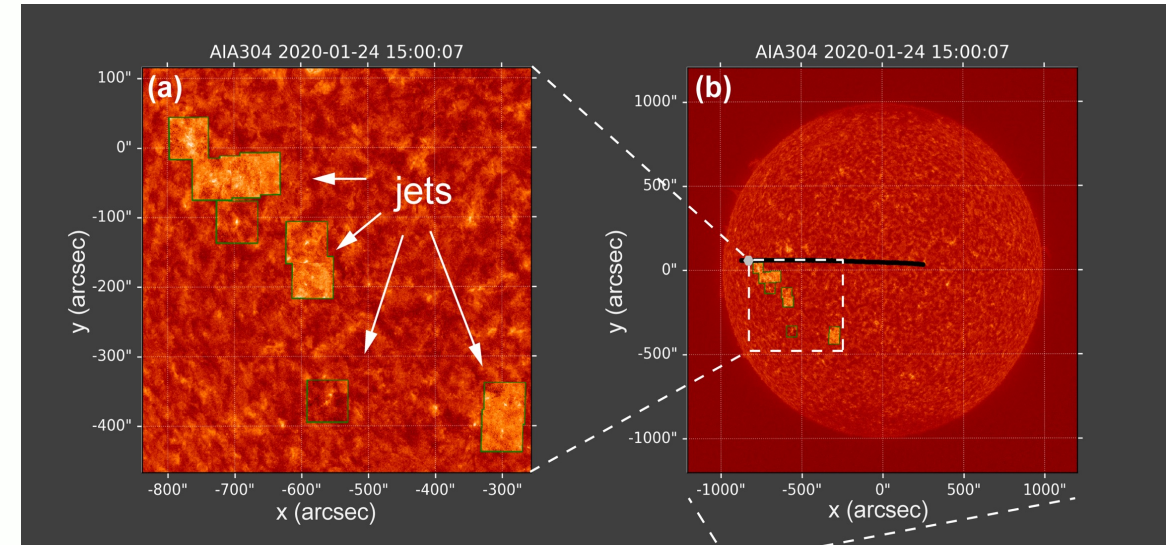
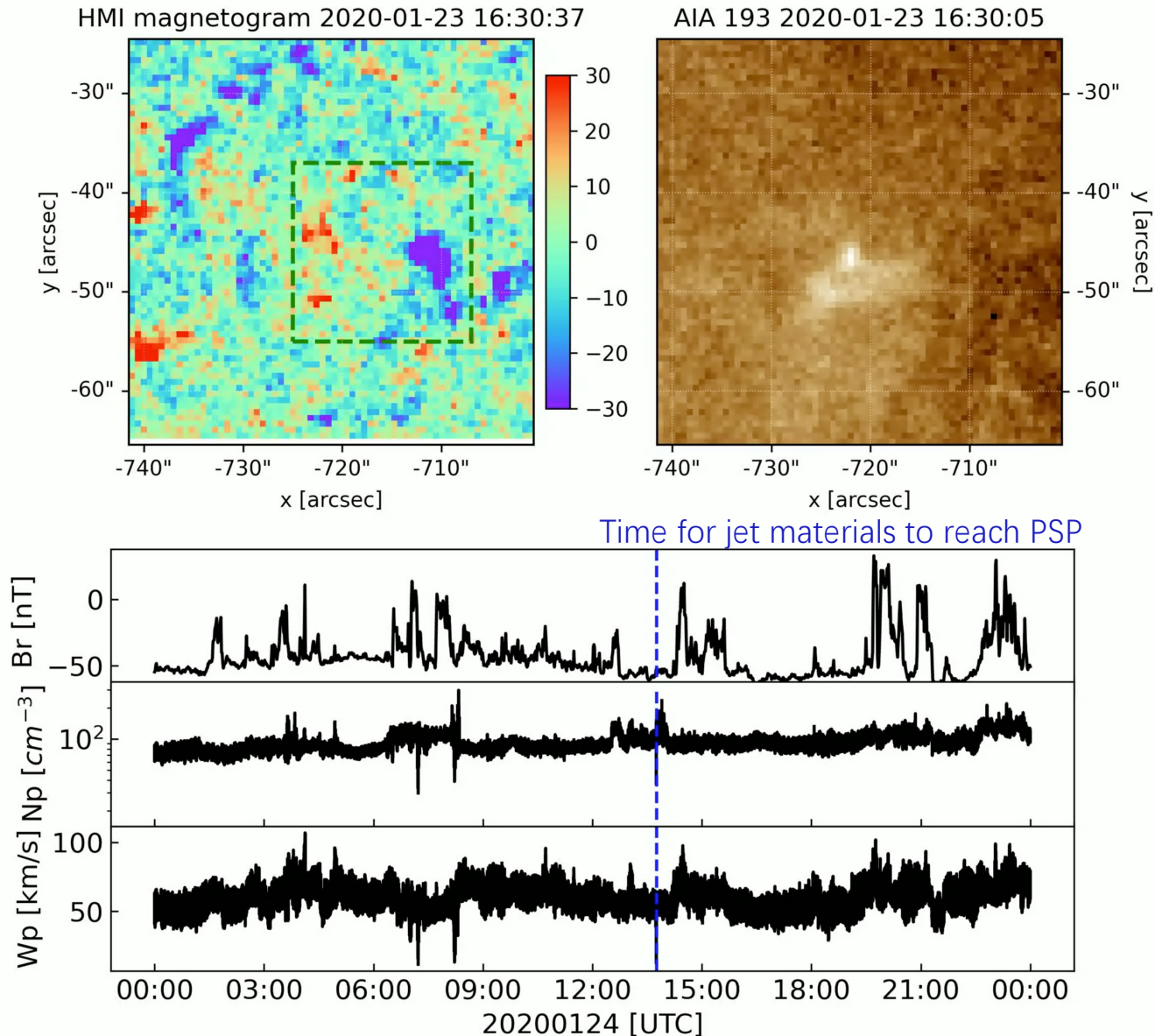


- Interchange magnetic reconnection **model** can (He et al., ApJL 913:L14, 2021):
 1. accelerate jet flows; 2. launch Alfvénic wave pulses.
- The radial nonlinear evolution of the Alfvénic pulses may explain the formation of magnetic switchback.
- Therefore, We analyzed the relationship of small coronal jets and switchbacks in observations to verify Interchange magnetic reconnection model.



[He et al., ApJL 913:L14, 2021]

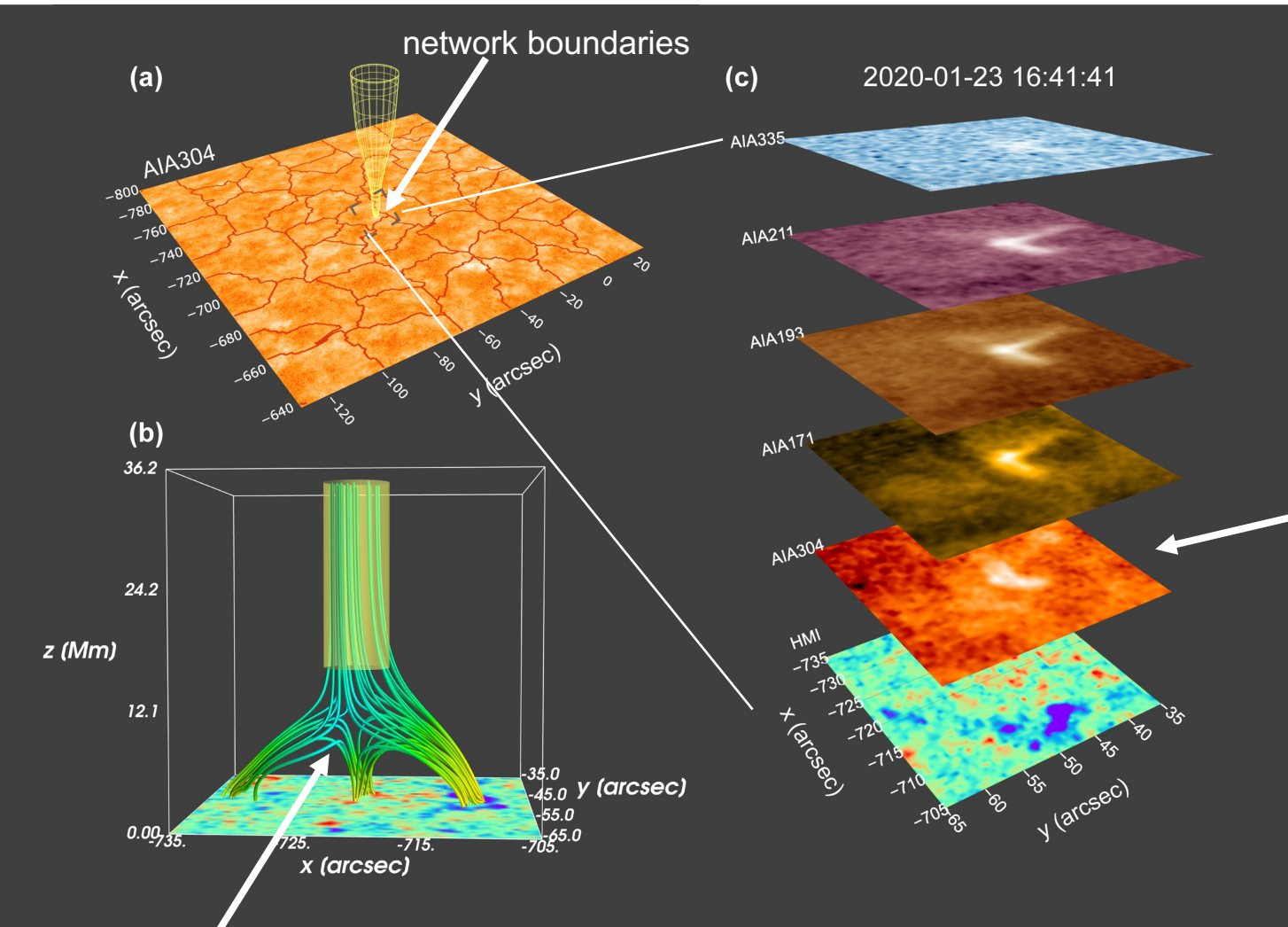
Detailed analysis of one coronal jet



We identify ten jets corresponding to the PSP-switchbacks and find relevance between jets and patches of switchback.

we use a **two-step ballistic backmapping method** to determine the foot-points of the magnetic lines during switchbacks measured by PSP.

Detailed analysis of one coronal jet



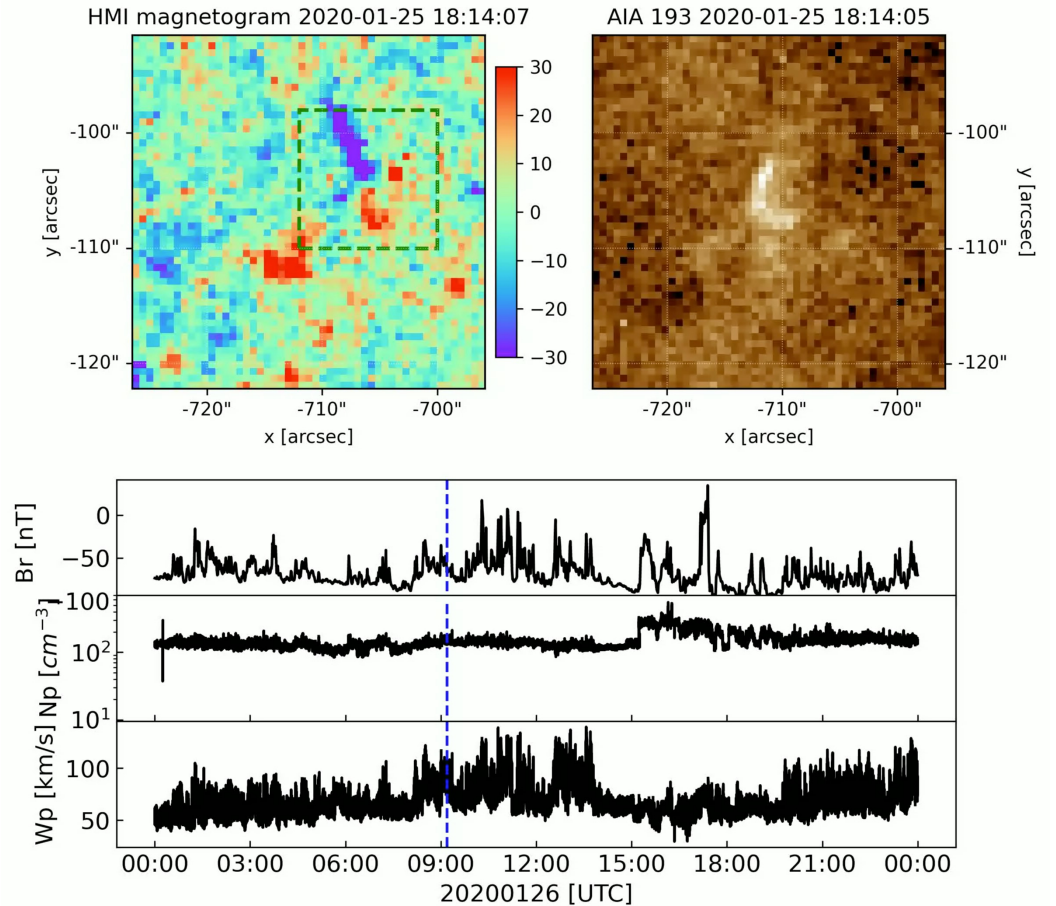
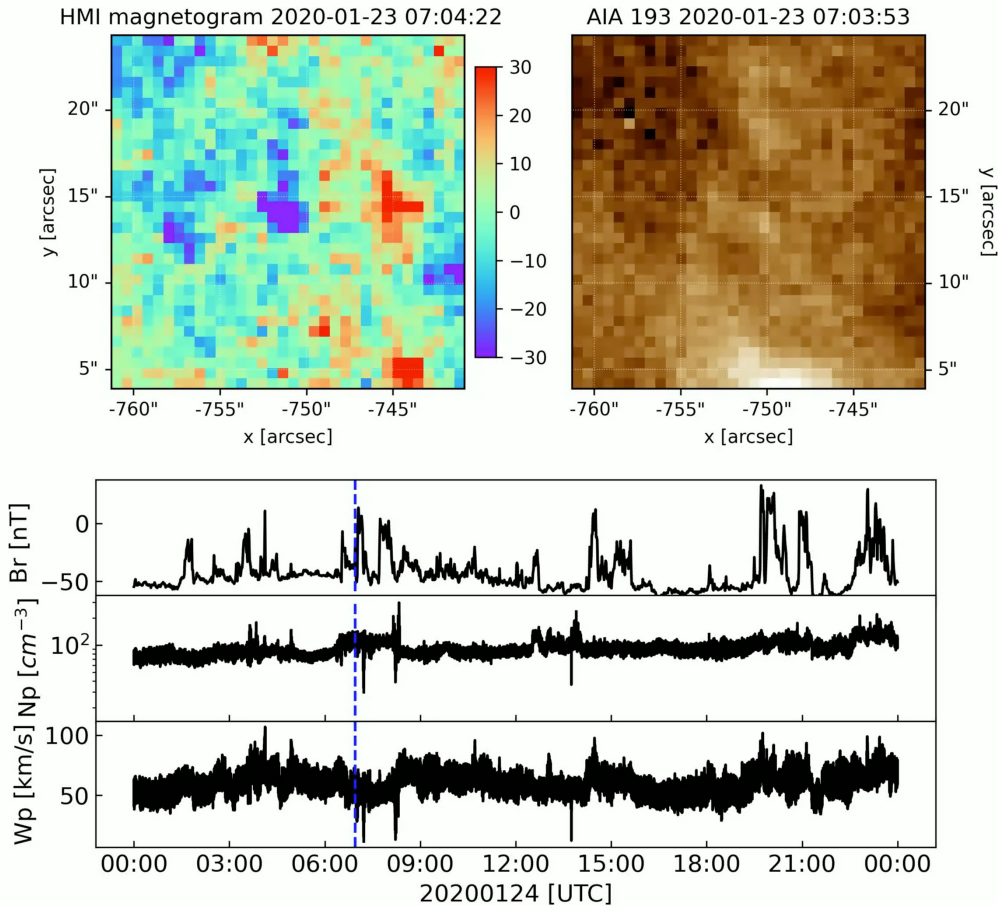
- Jets excite at the height of around low corona and position of chromospheric network boundaries.

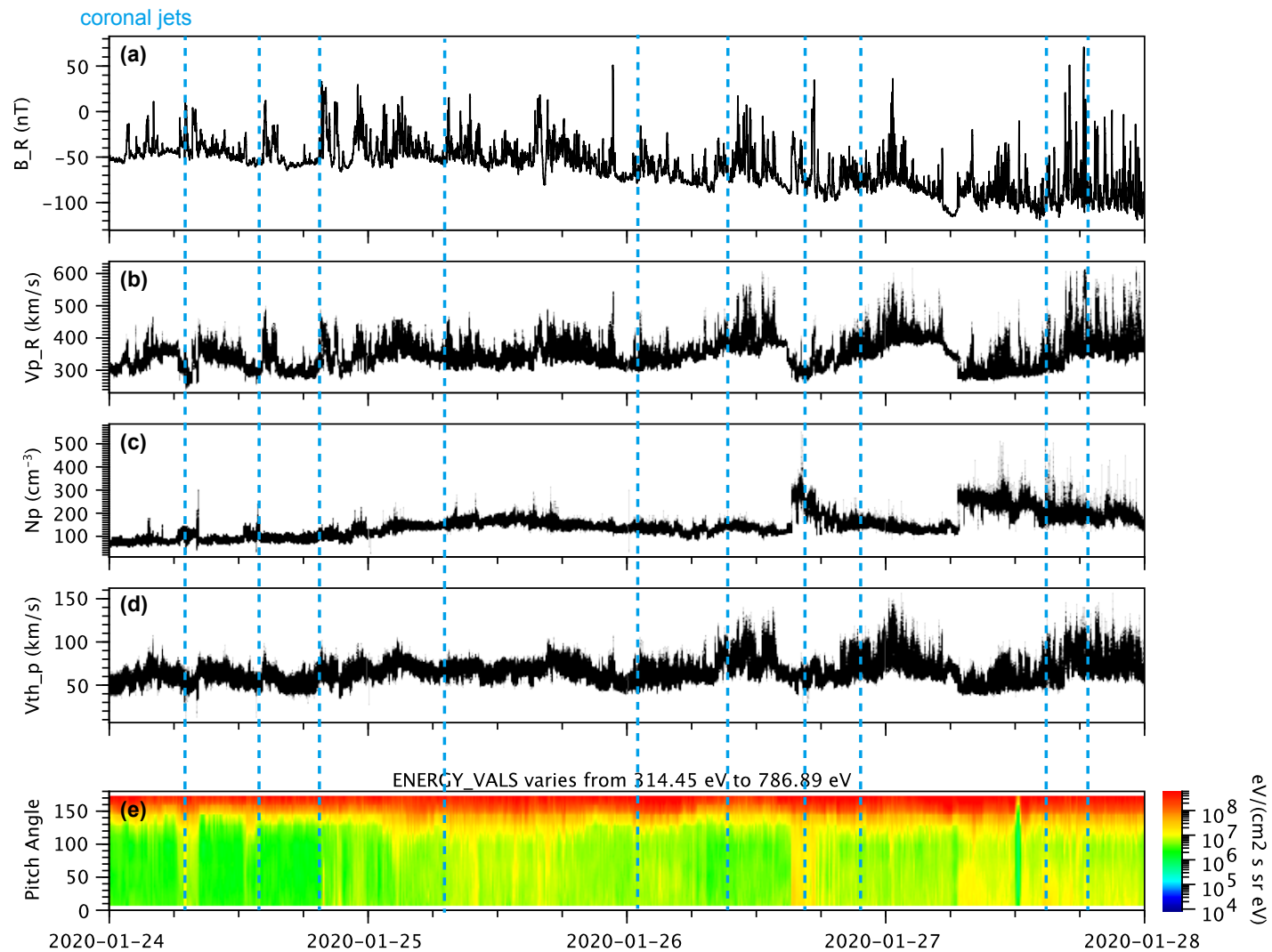
High chromosphere or low corona

- Jets excite via interchange magnetic reconnection.

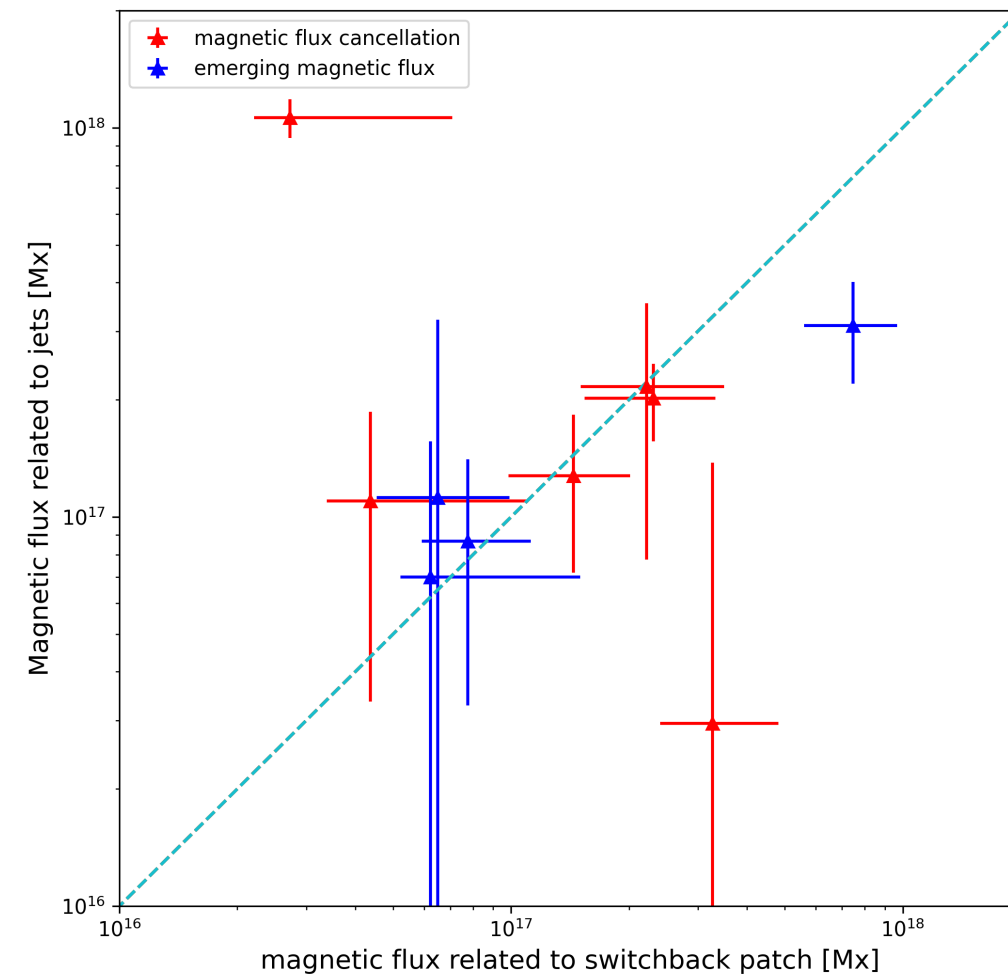
Magnetic field line
obtained by linear force free field extrapolation method

The other jets show y-shape and excite at low corona and chromospheric network boundaries.

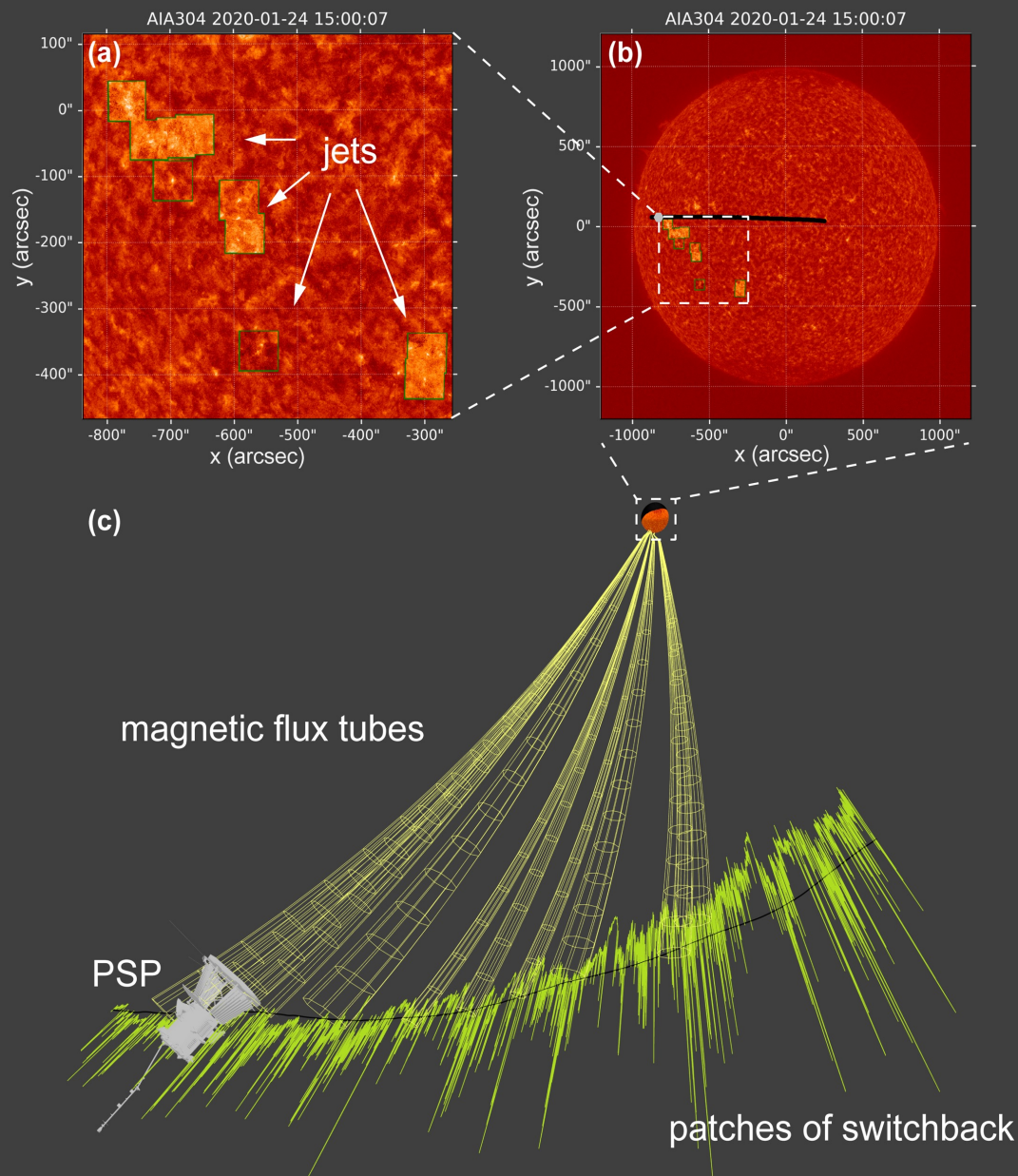




➤ Coronal jets correspond in time to patches of switchbacks.



➤ The variation in magnetic flux is quantitatively equal to that of radial magnetic flux associated with switchback patches.



Conclusions

- We identify ten jets corresponding to the PSP-switchbacks and find relevance between jets and switchback patches.
- We find that jets excite at the height of around low corona and position of chromospheric network boundaries.
- The variation in magnetic flux corresponding to magnetic cancelation and magnetic emergence is quantitatively equal to that of radial magnetic flux associated with switchback patches.
- These features suggest that **switchbacks may originate from the interchange magnetic reconnection at chromospheric network boundaries.**