# LatHyS hybrid simulation of the August, 10 2021 BepiColombo Venus flyby
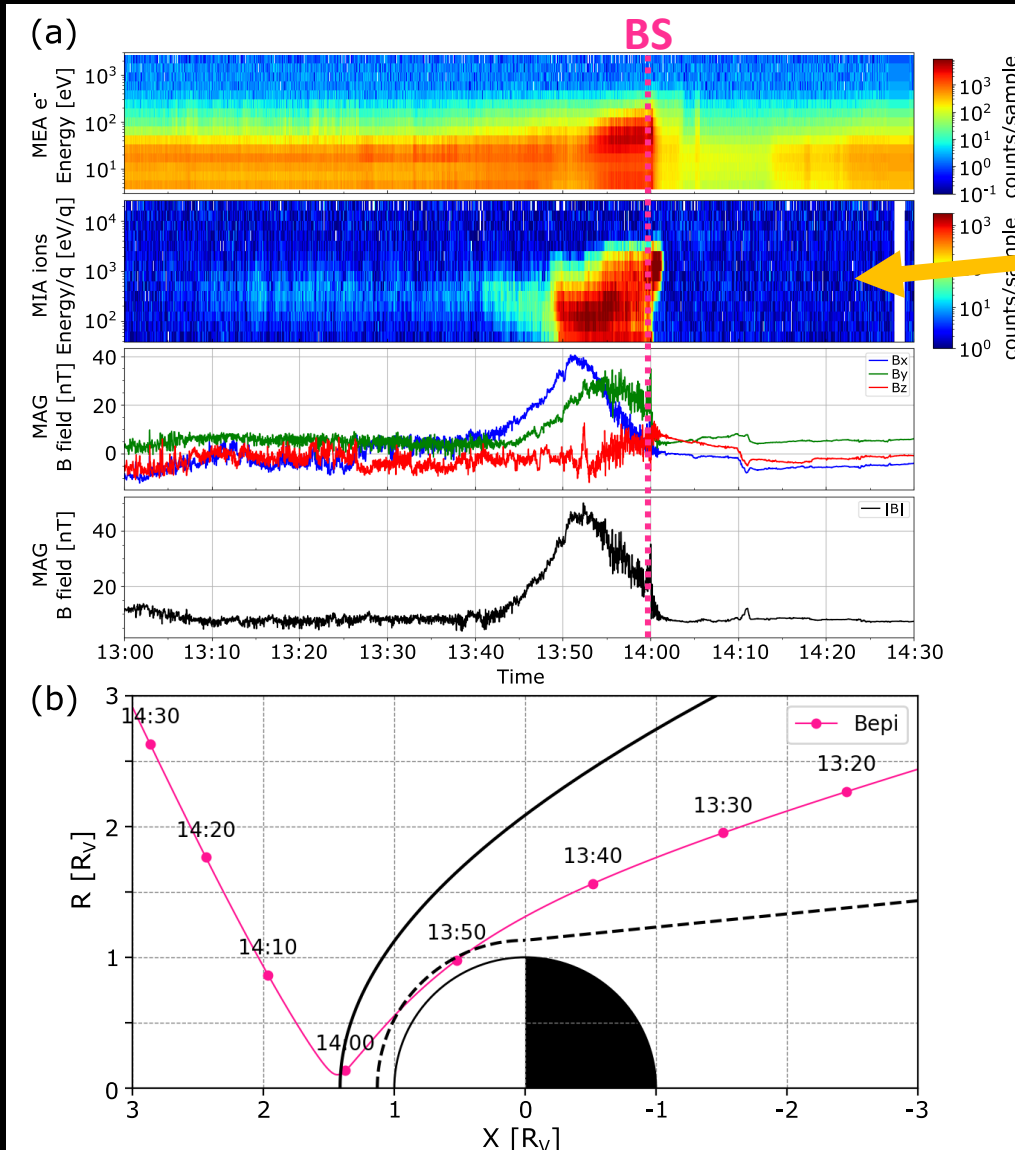
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(IRAP → ISAS/JAXA & University of Pisa)

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C. Baskevitch, D. Heyner, Y. Saito, Y. Harada, F. Leblanc, A. Barthe, E. Penou, A. Fedorov, J.-A. Sauvaud,
S. Yokota, U. Auster, I. Richter, J. Mieth, T. S. Horbury, P. Louarn, C. J. Owen, G. Murakami
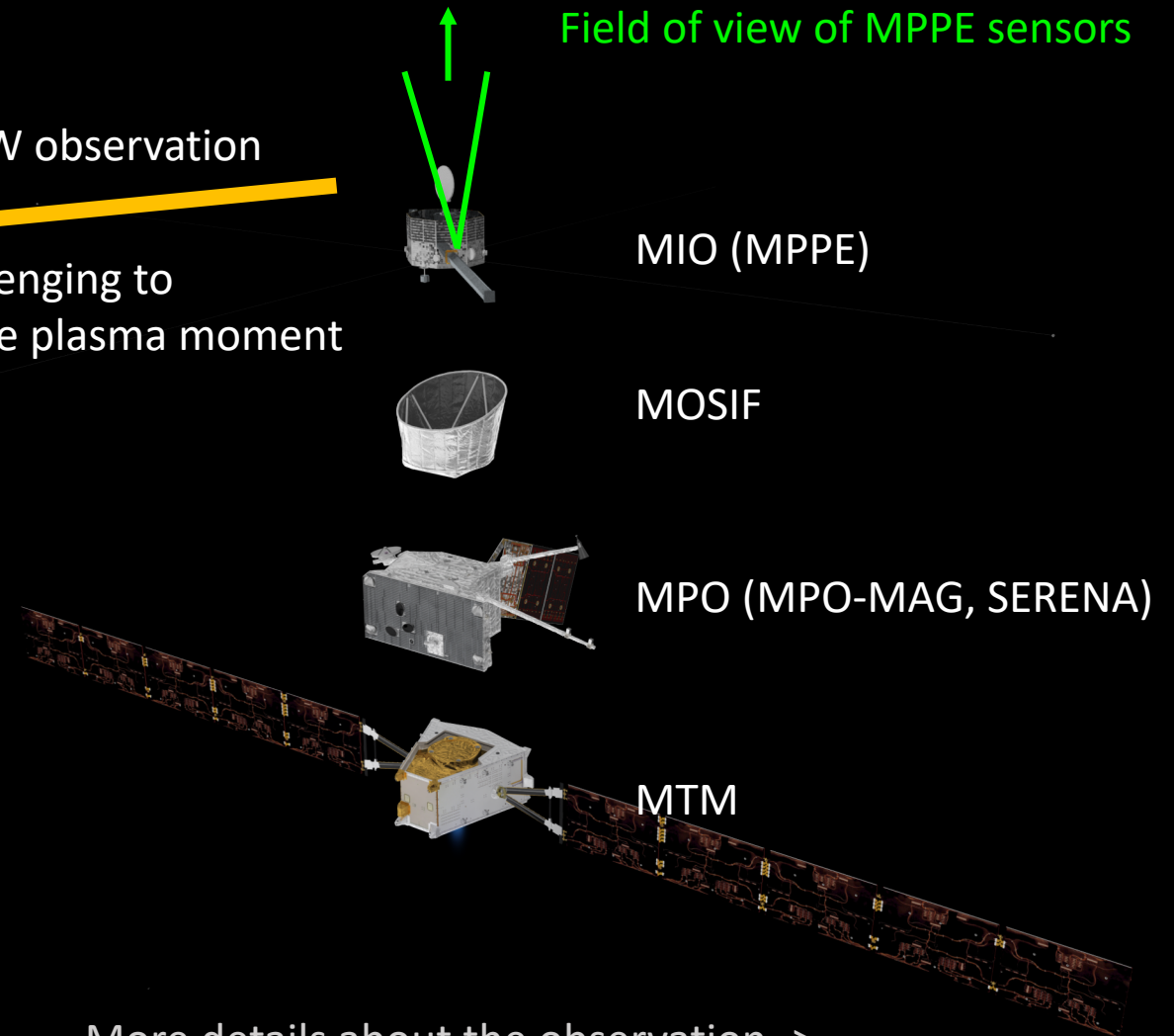
BepiColombo's 2nd Venus flyby with Solar Orbiter

200 Rv (= 0.008 AU)

Solar Orbiter

BepiColombo

10th of Aug, 2021

They were on the same Parker Spiral
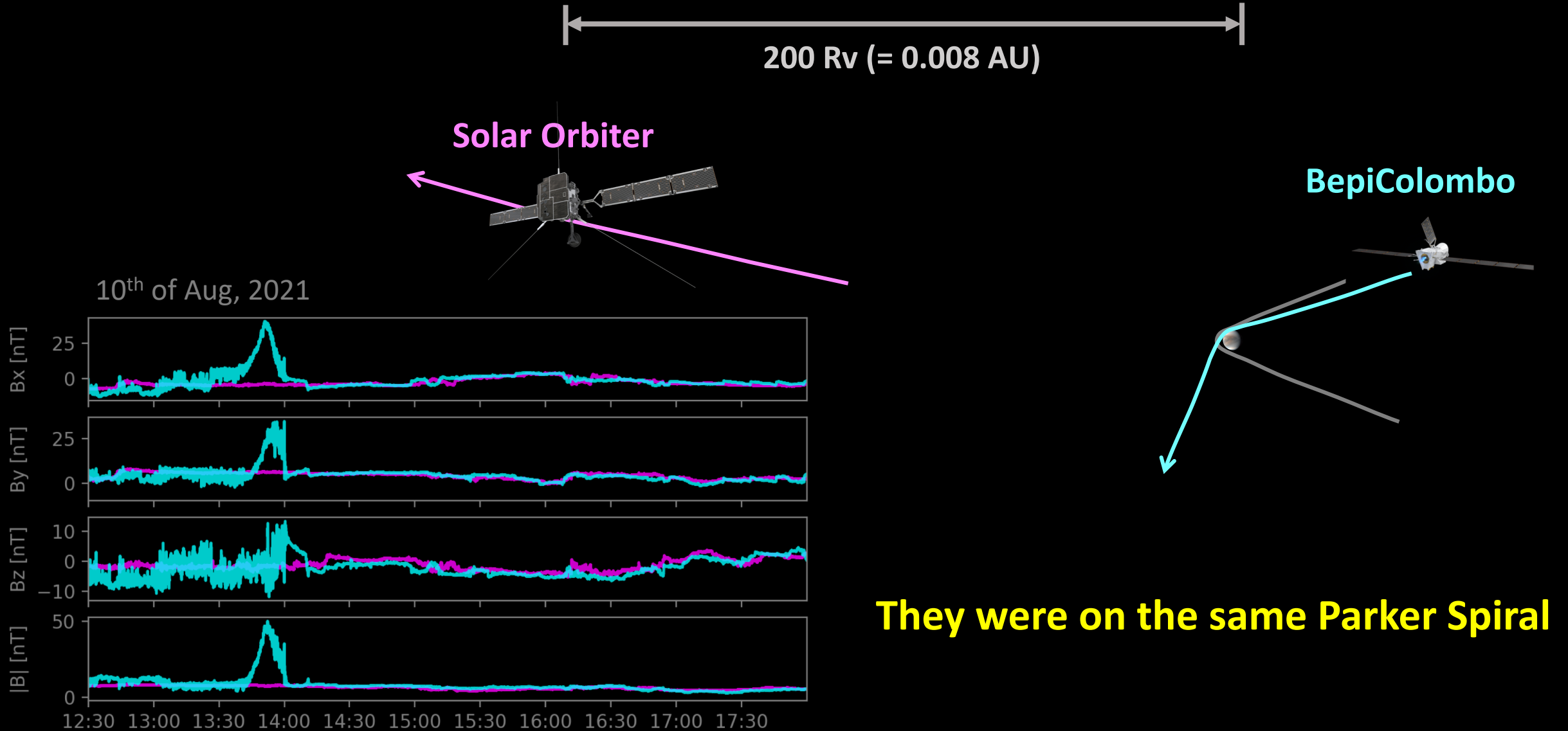
Observation by BepiColombo and its limitation

(a)

BS

Field of view of MPPE sensors

No SW observation

Challenging to derive plasma moment

MIO (MPPE)

MOSIF

MPO (MPO-MAG, SERENA)

MTM

(b)

More details about the observation ->
Persson, Aizawa et al., 11:36–11:43, EGU22-3903

Newly developed global hybrid simulation LatHyS for Venus

- 3D Cartesian global hybrid simulation

- Exosphere: H, O, and CO2
  (SZA dependent as much as possible)

- Ionization processes:
  Photoionization (EUVAC model)
  charge exchange, electron impacts

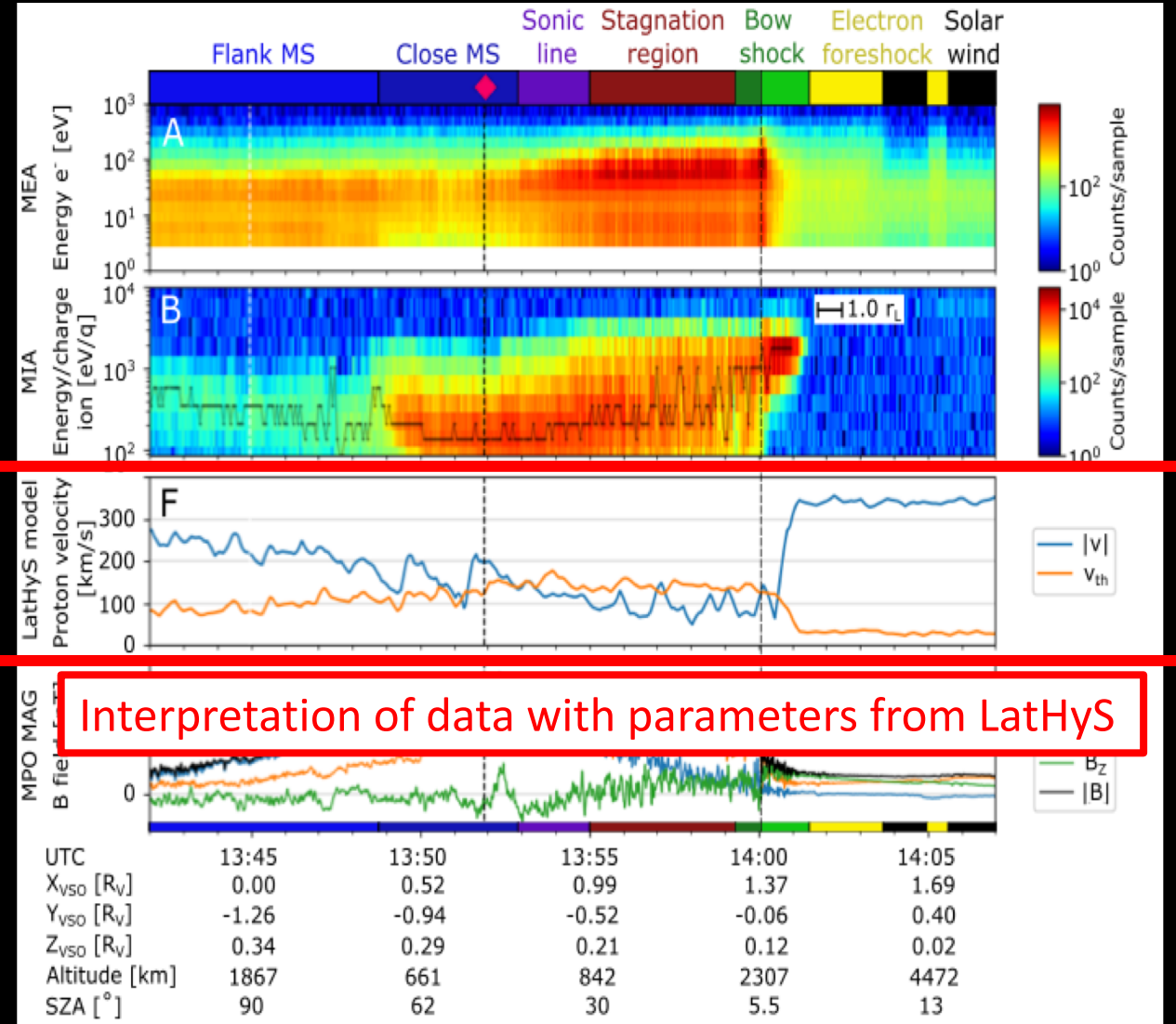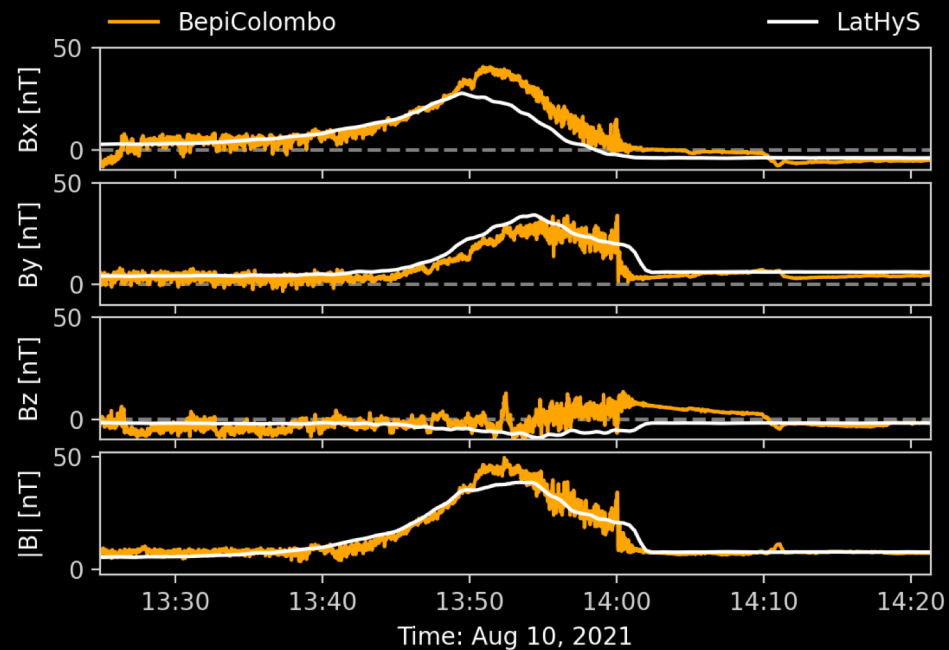- Validated with Venus Express data
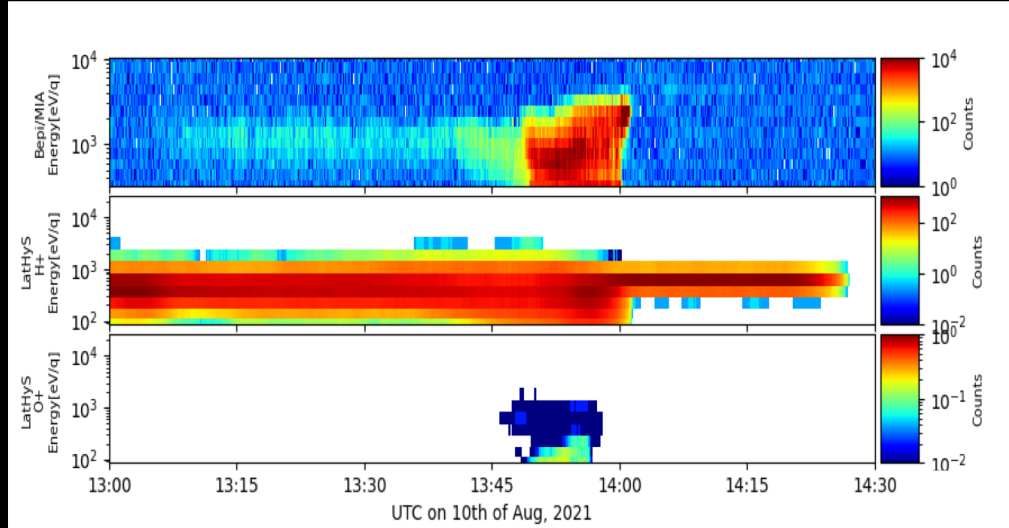
The case of VEX observation
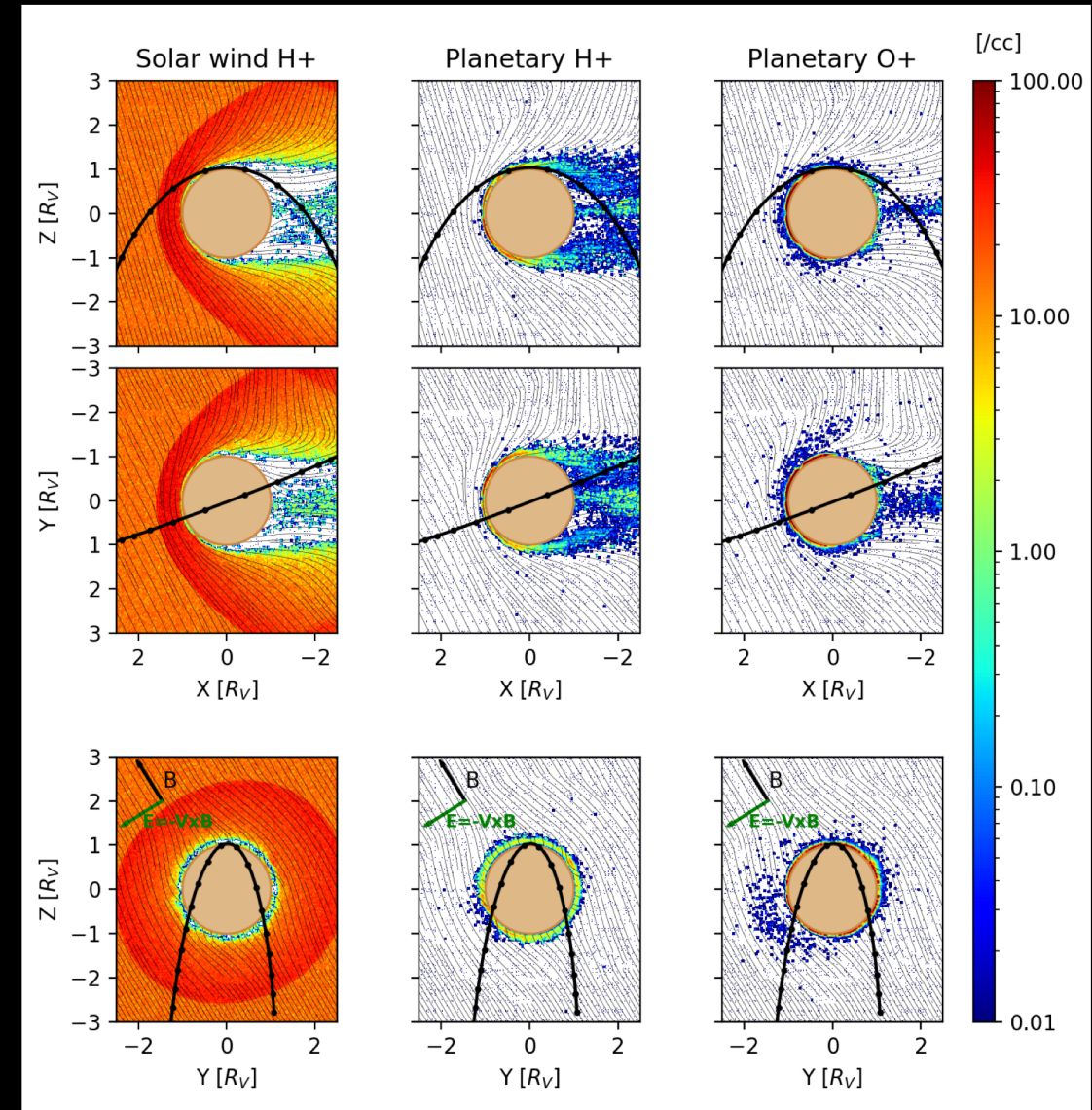
Interpretation of data, and understanding of FOV
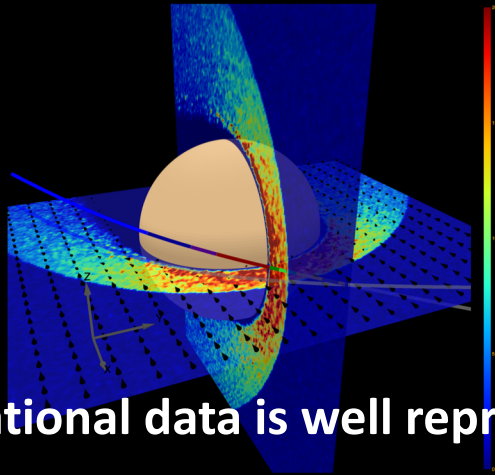
Observational data is well reproduced

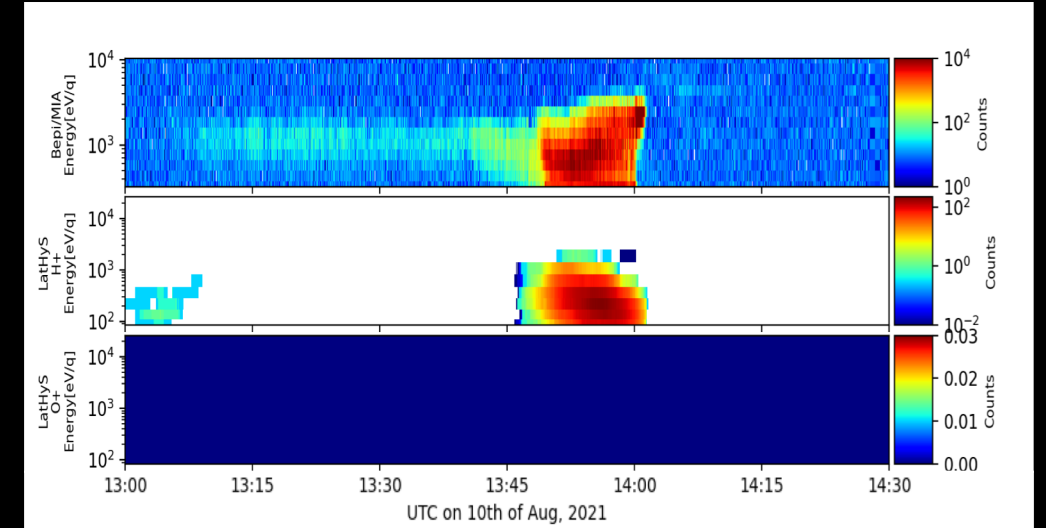Interpretation of data with parameters from LatHyS

[Persson, Aizawa et al.,]

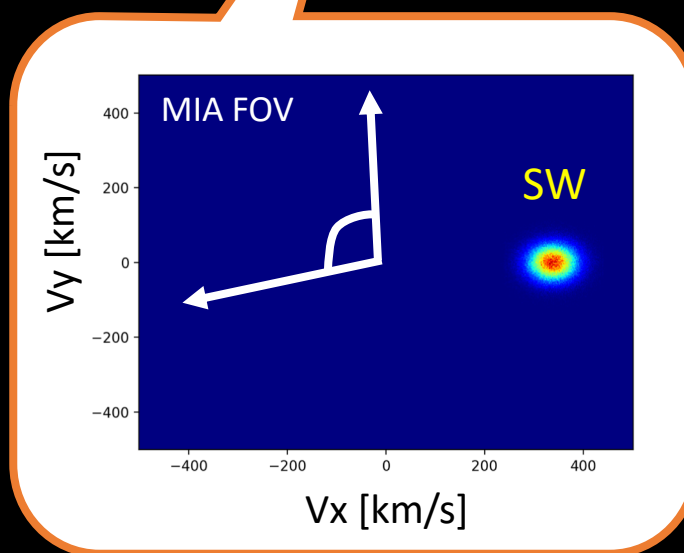# Interpretation of data, and understanding of FOV

Full FOV

FOV filter

Limited FOV

- Detection of Oxygen ions with full FOV

- Partial detection of protons
- No detection of Oxygen ions

Take away points

➢ Rare opportunity to investigate Sun-Venus interaction happened during BepiColombo 2nd Venus flyby
  - Solar Orbiter and BepiColombo were on the same Parker Spiral

➢ We have developed new global hybrid simulation for the Venusian environment
  - Solar Orbiter data to constrain the input parameters
  - Simulation outputs well matched with the BepiColombo observation
  - Simulation can provide any plasma parameters -> useful to interpret the data

➢ The effect of FOV has been examined
  - Virtual sampling of plasmas shows well-matched spectra for protons with limited FOV
  - No oxygen ions could be detected by MPPE sensors

Paper is already published in PSS!