

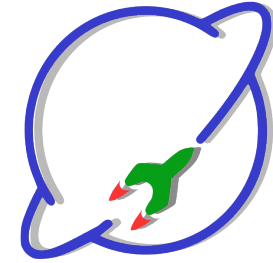


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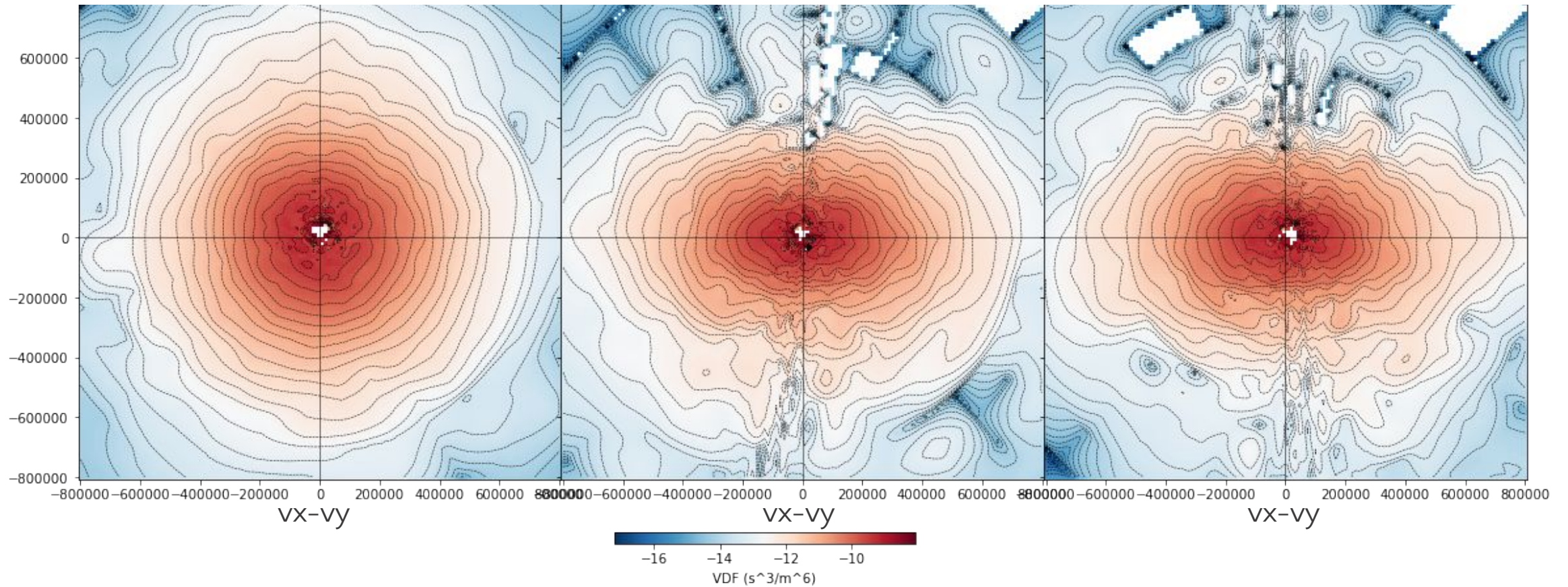
Analysis of Velocity Distribution Functions using Gaussian Mixture Model

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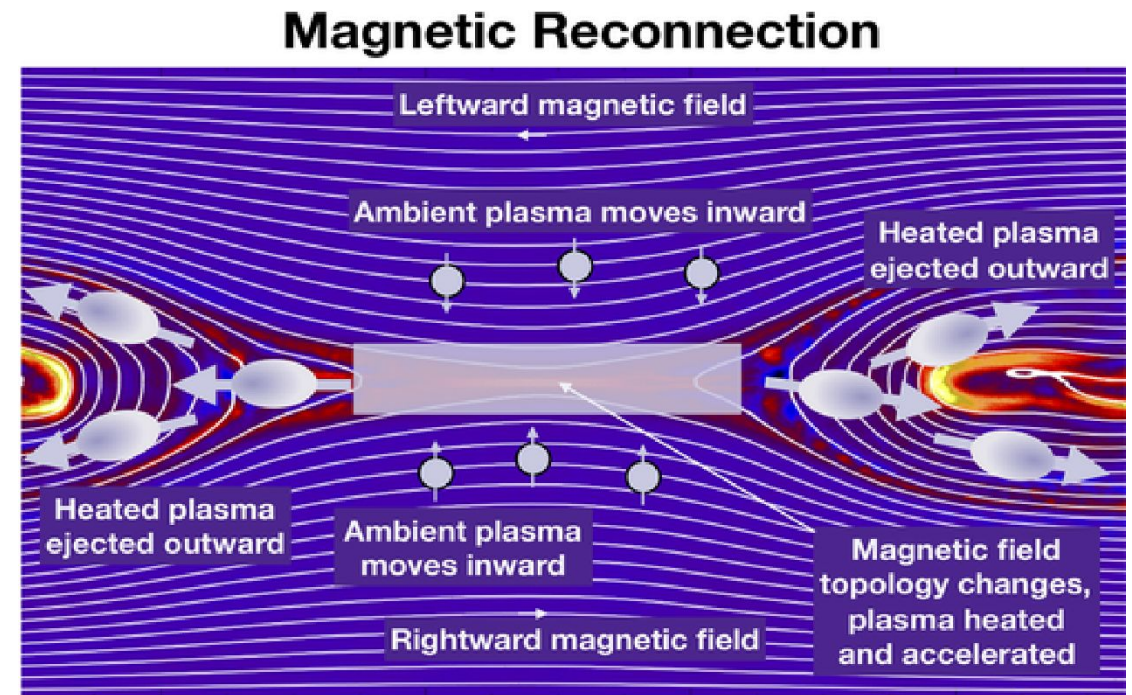
ML4ASTRO2

Velocity Distribution Function (VDF) from MMS



Magnetic Reconnection

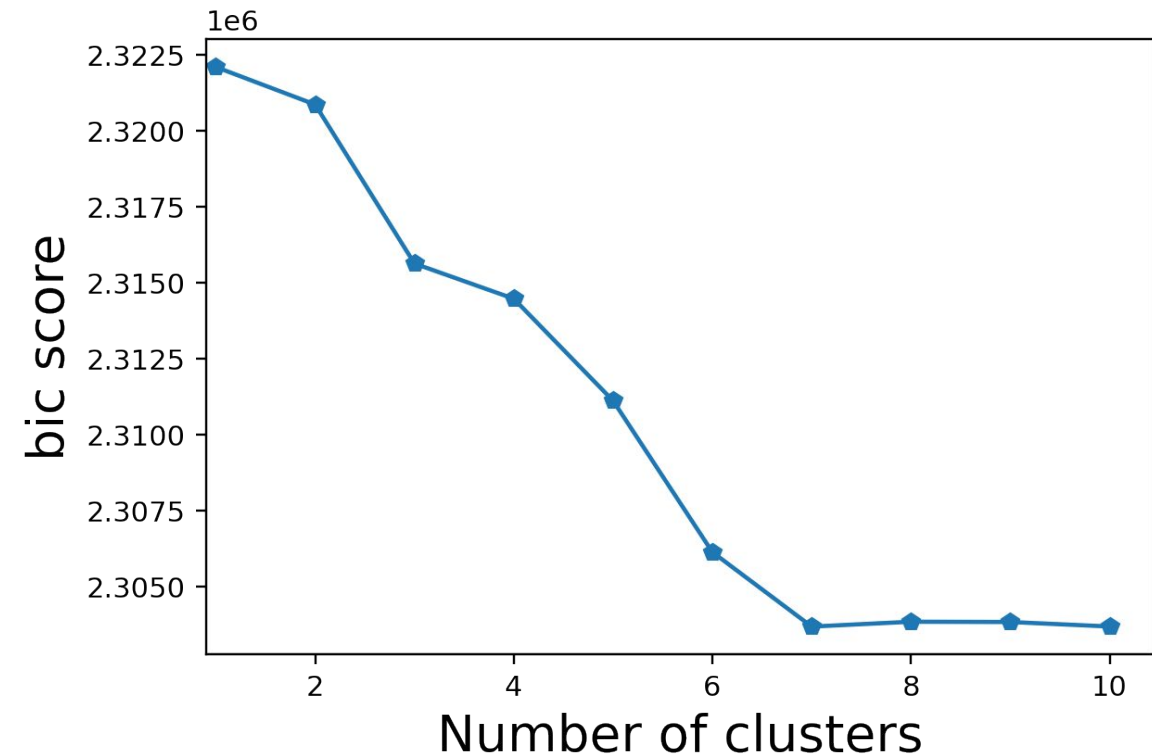
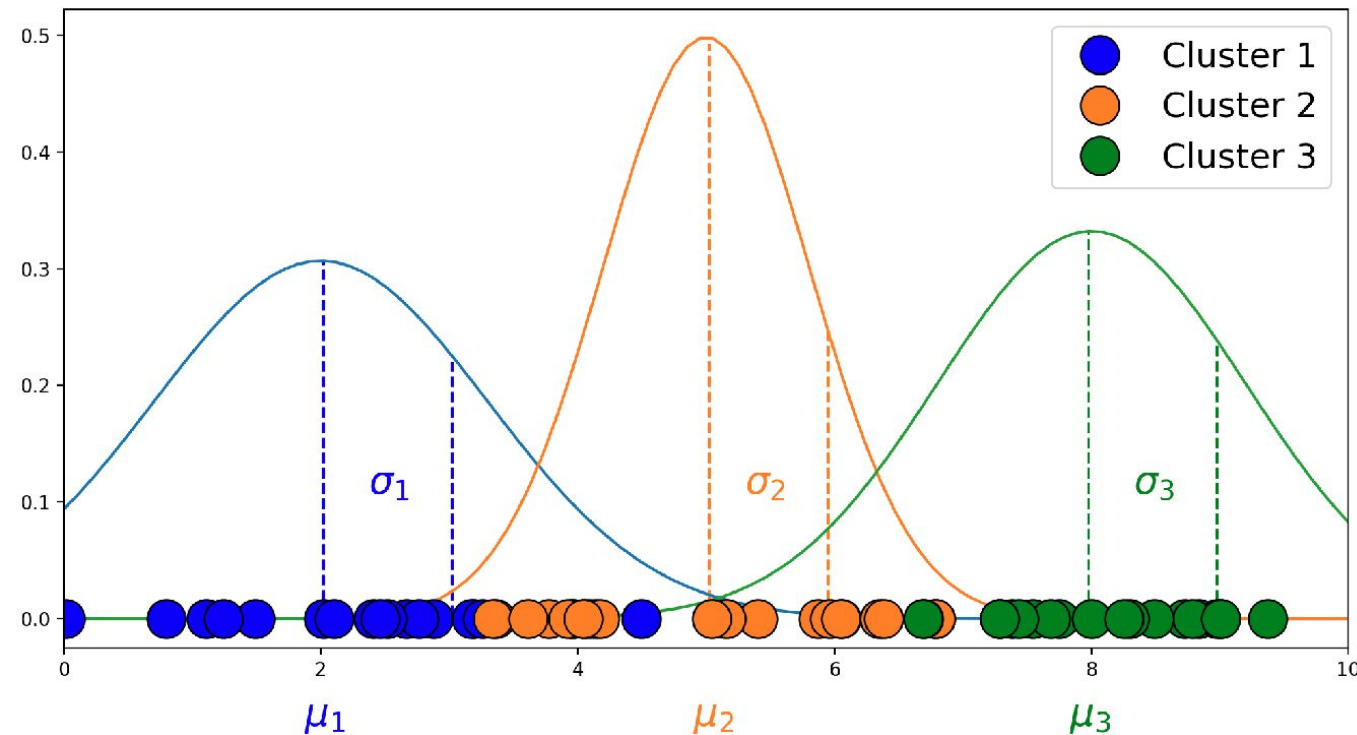
- During reconnection, magnetic field lines break their connection and reconnect with different field lines.
- In the X-point the reconnected field has a strong magnetic tension, which pulls the reconnected field away expelling the plasma as bi-directional outflow jets
- The magnetic field energy is converted into kinetic energy, thermal energy, and particle acceleration energy



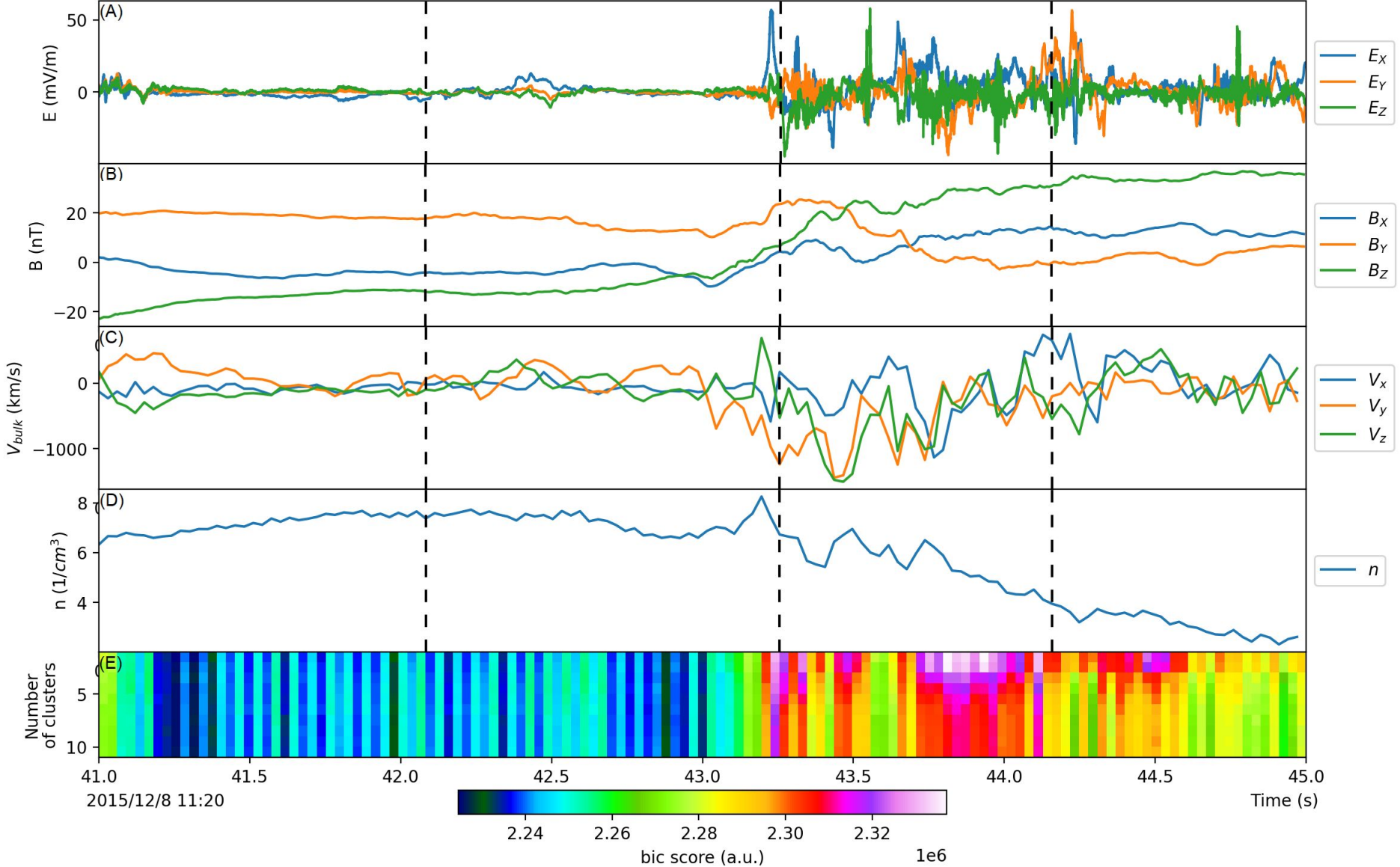
Gaussian Mixture Models and BIC Score

- The clusters of the dataset are assumed to follow normal distributions, the task is to find the parameters of the Gaussians

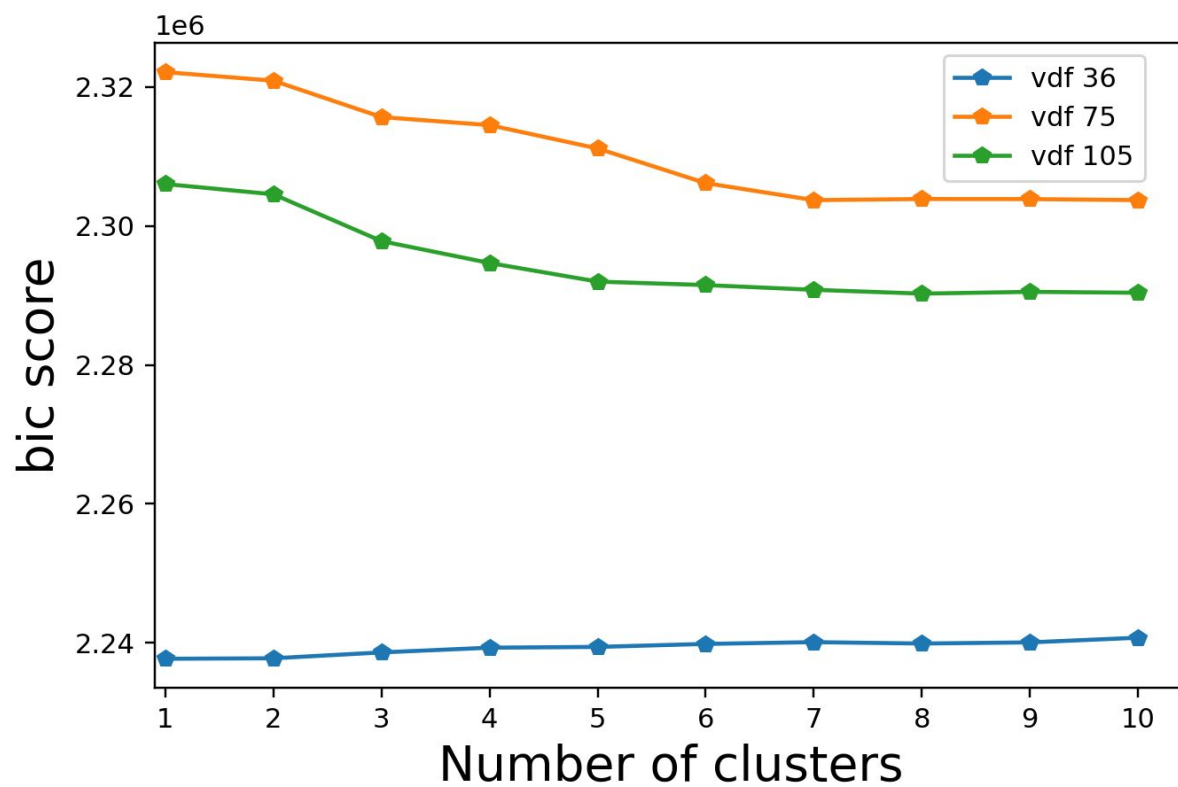
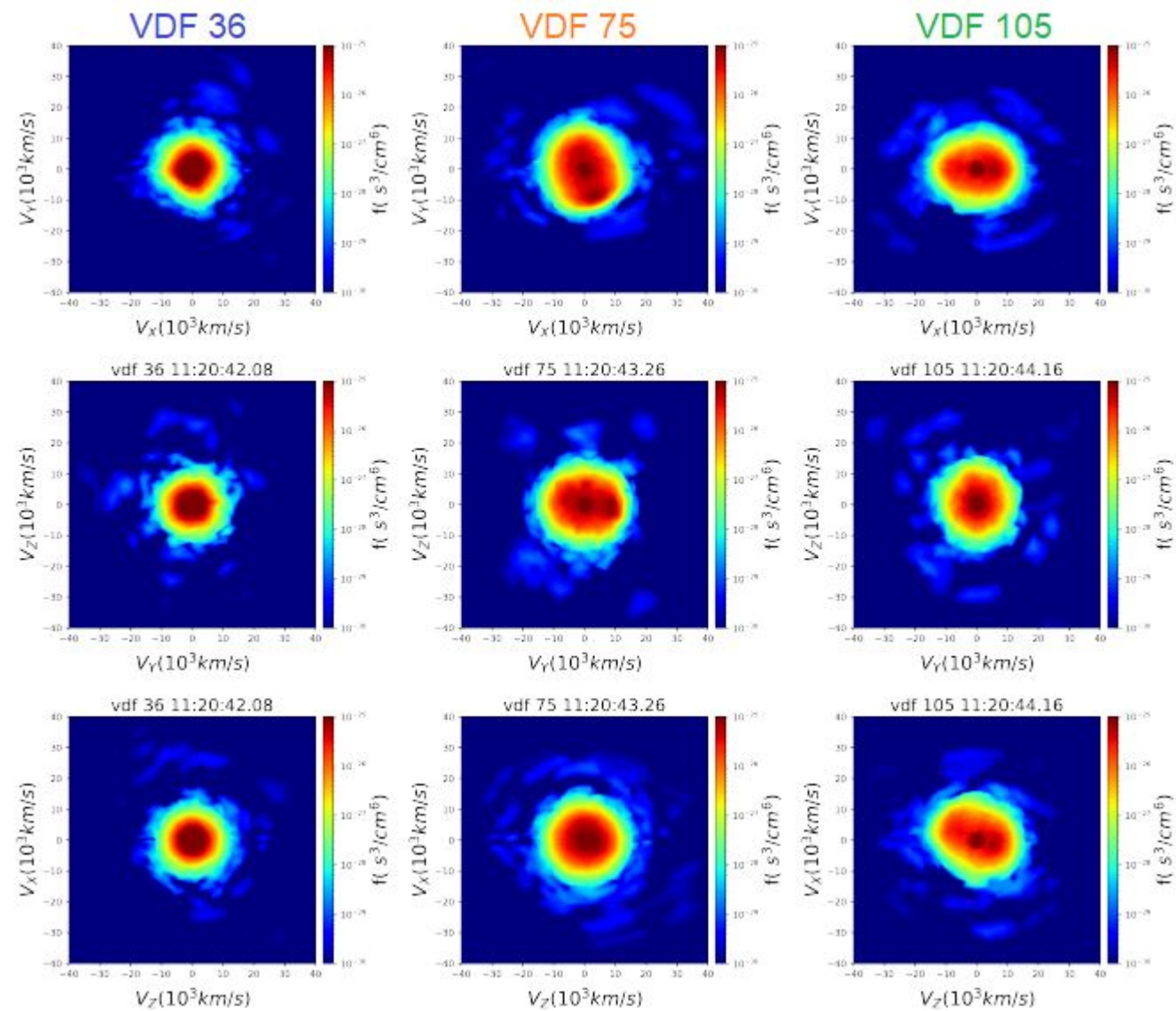
- BIC score is an estimator related to the quality of the Gaussian mixture for a dataset, it estimates the number K of Gaussians to give as an input to the algorithm



Results: Dayside reconnection



Results: Dayside reconnection



Thank you!

Sanò et al., Analysis of Electron Distribution
Functions using the Gaussian Mixture Model
[Under review], retrievable from ESS Open Archive,
DOI: [10.22541/essoar.170688961.11428734/v1](https://doi.org/10.22541/essoar.170688961.11428734/v1)

