Intra-pulse variability induced by plasmoid formation in pulsar magnetospheres

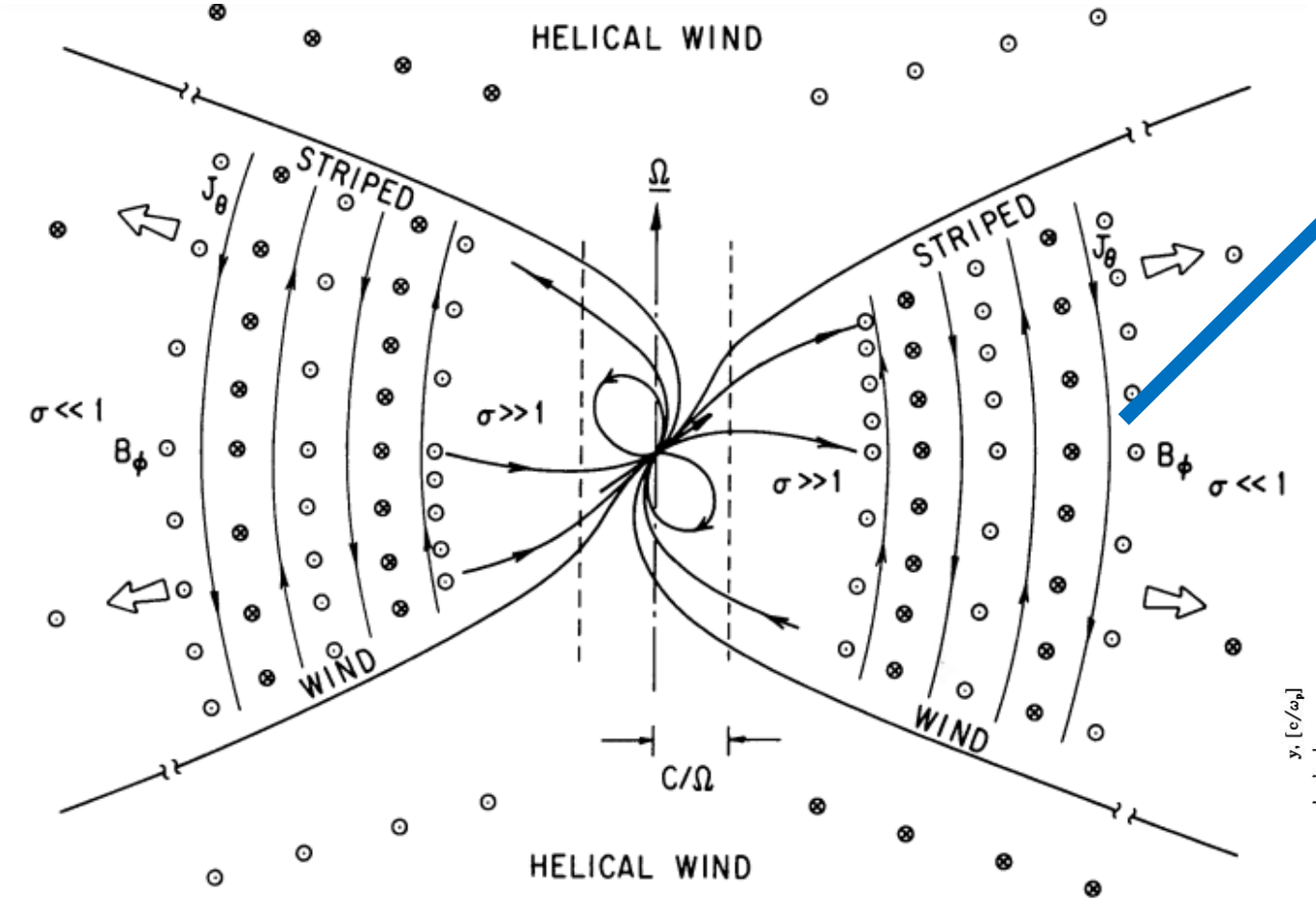
I. Ceyhun Andaç[1,2], Benoît Cerutti[1], Guillaume Dubus[1], and K. Yavuz Ekşi[2]

[1] Univ. Grenoble Alpes, CNRS, IPAG, 38000 Grenoble, France
e-mail: benoit.cerutti@univ-grenoble-alpes.fr
[2] Istanbul Technical University, Faculty of Science and Letters, Physics Engineering Department, 34469, Istanbul, Turkey

A&A 2022/5/5

By 曹顺顺 2022.7

Consider particle emission in outer region of pulsars' magnetosphere:

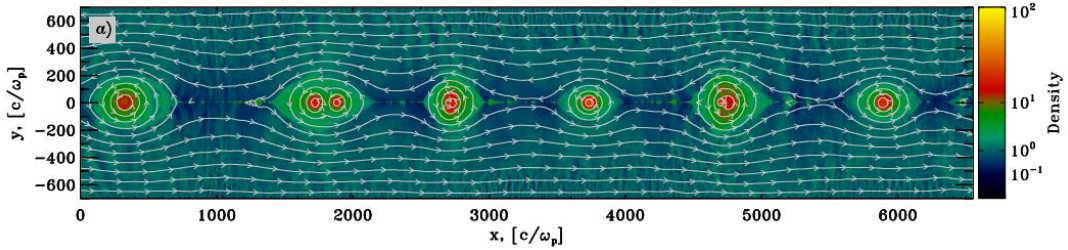


Coroniti 1990

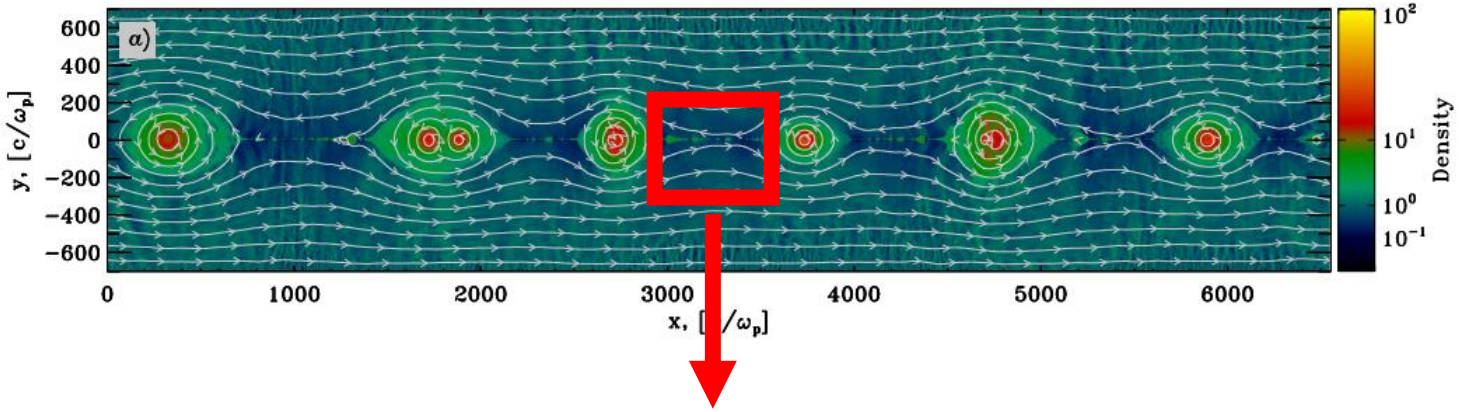
Long and thin current layers

Tearing

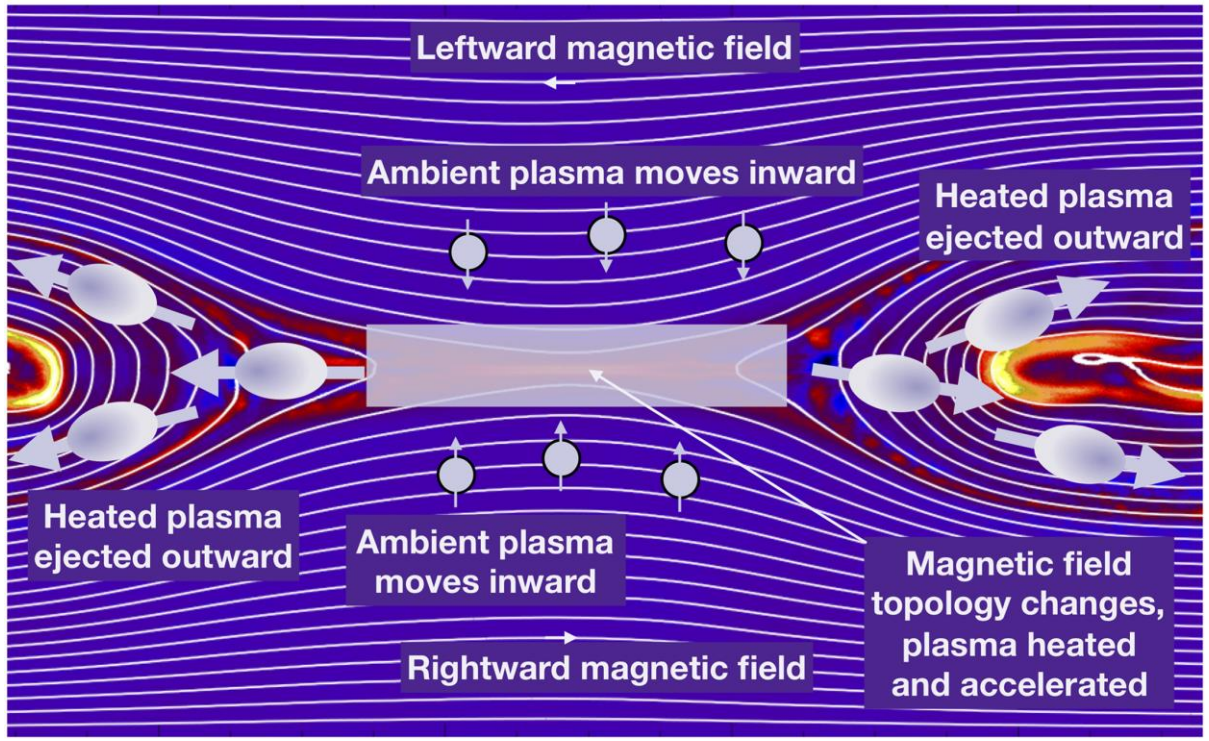
Chains of plasmoids



Kagan et al. 2015



Magnetic Reconnection

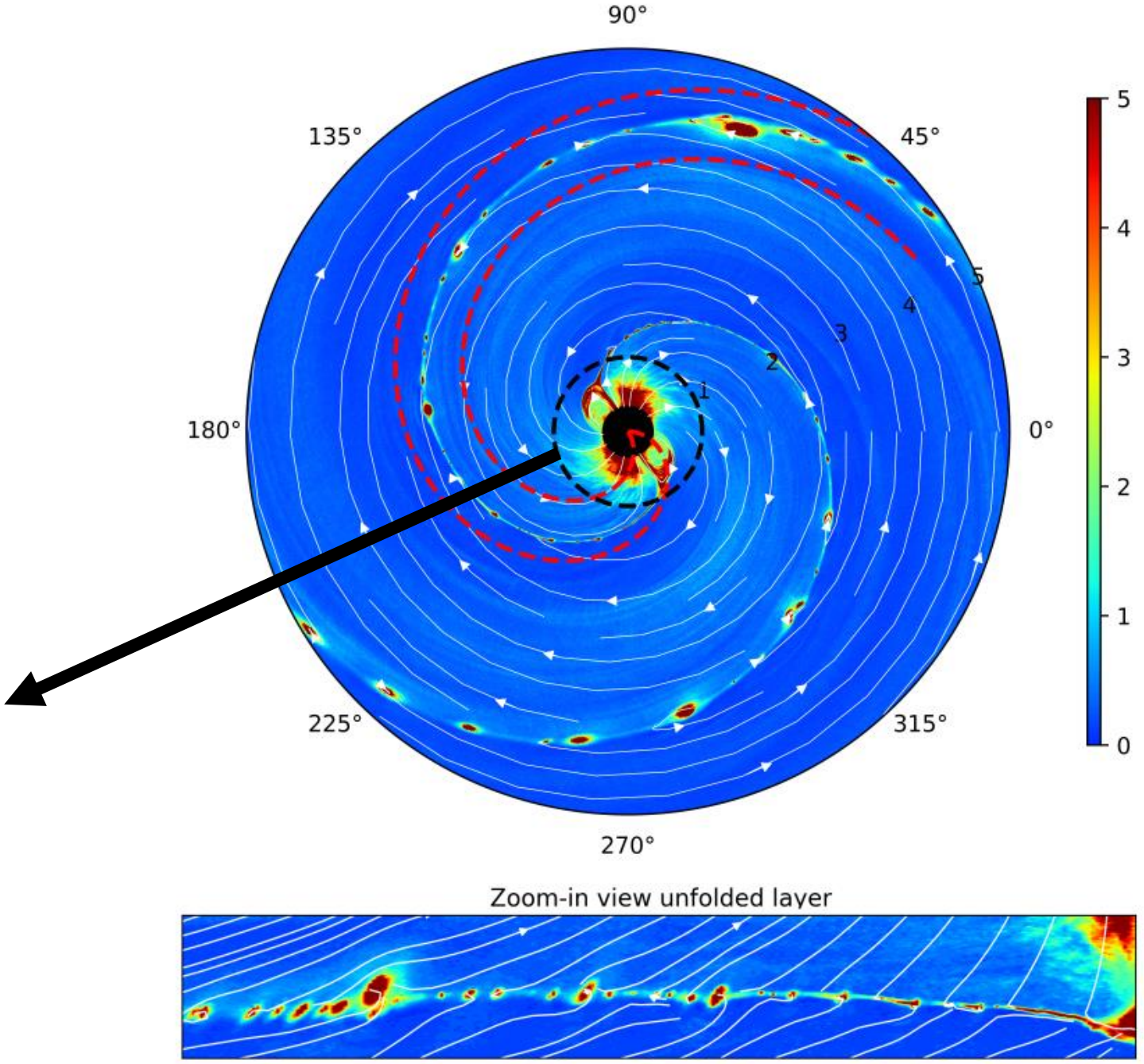


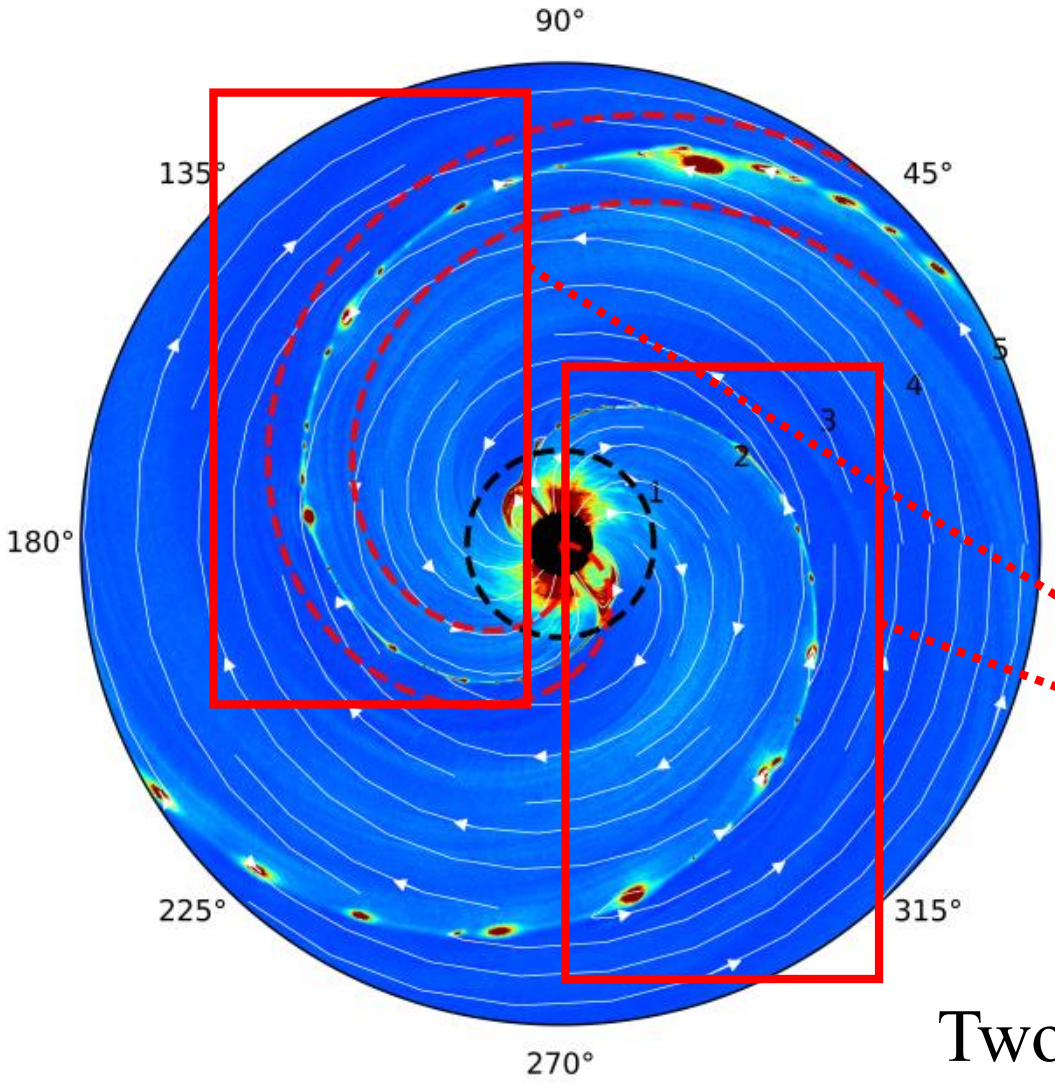
Hesse and Cassak 2019

Lead to particle acceleration and **high energy** incoherent emission.

Simulation:
a $\mu \perp \Omega$ pulsar in the equatorial plane.

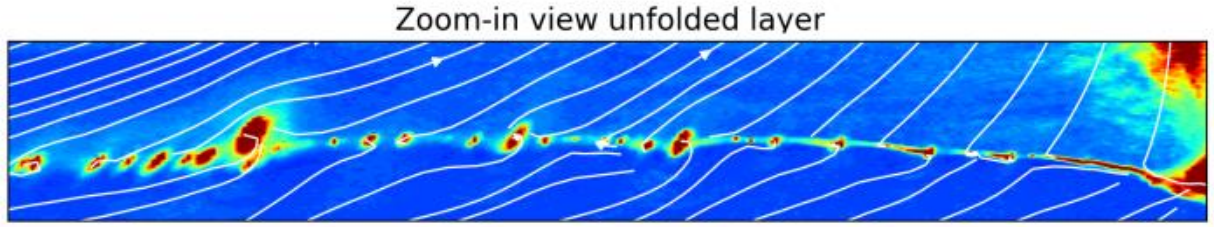
Light Cylinder Radius

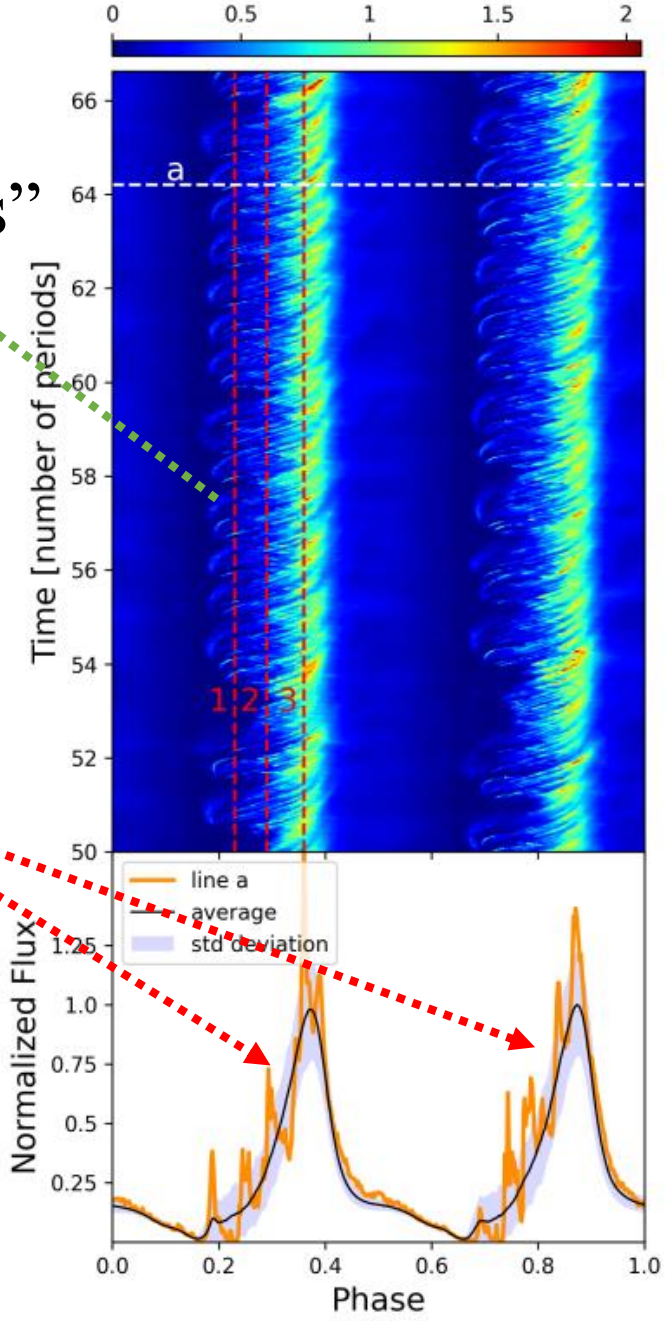


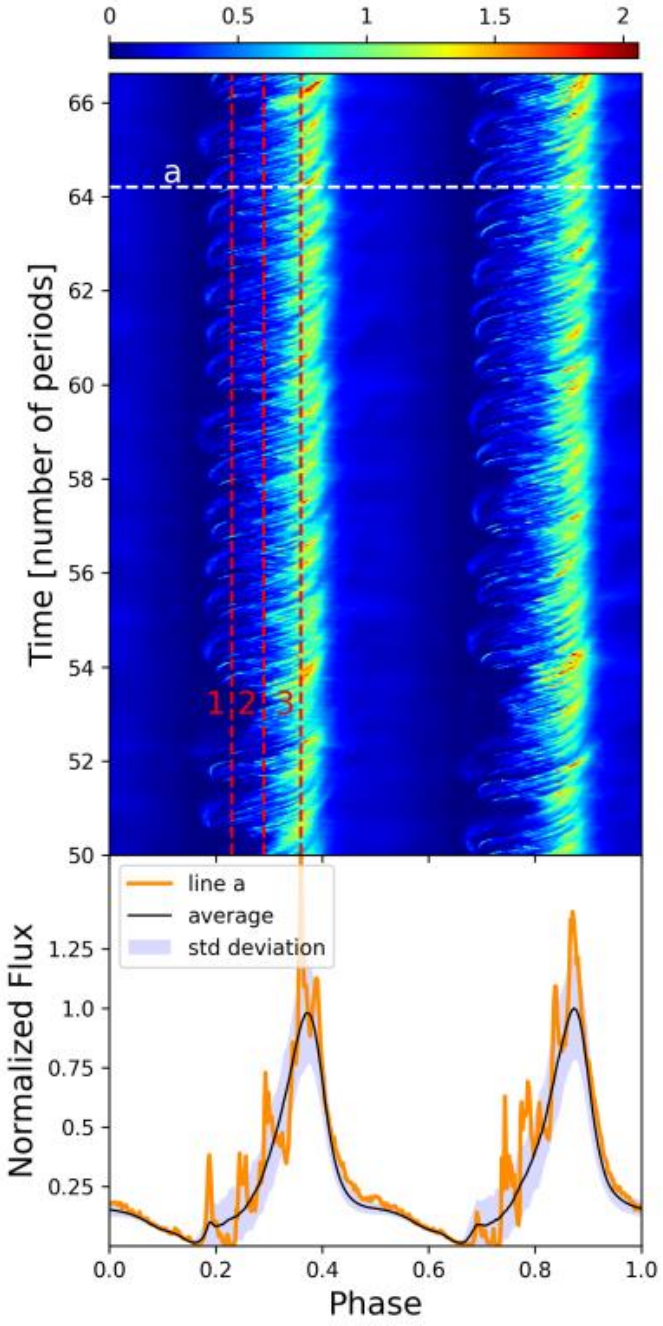


Quickly drifting "sub-pulses"

Two "spirals"







"Sub-pulses" formed from plasmoids.