ToPP! Topology of Pulsar Profiles

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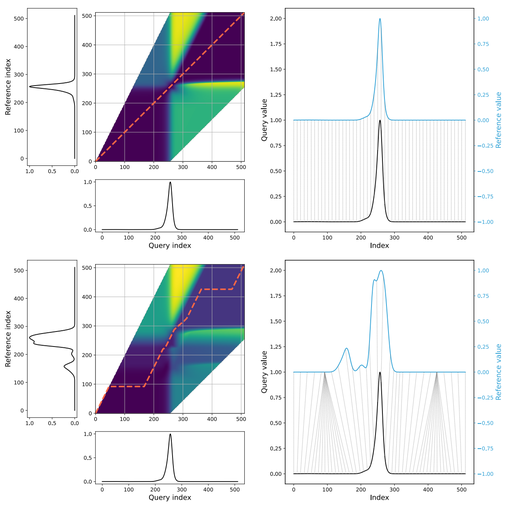
click here
article with J. van Leeuwen & Y. Maan (A&A, 2024)

Comparing profile's Stokes I morphology



$w = 0$ if identical

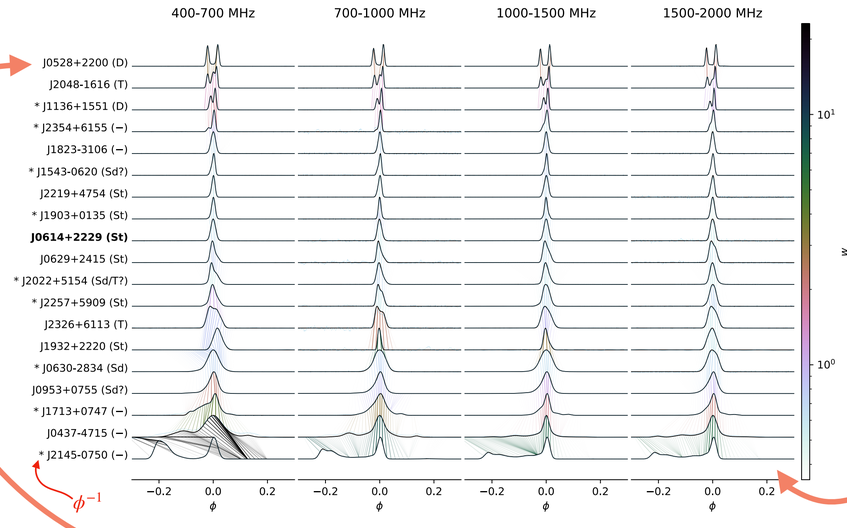
$w > 0$ if different

A **pulsar average profile** (intensity vs rotational phase) is its signature — essential tool for pulsar timing

Average profiles are (mostly) time-stable carrying info about emission regions and geometry

How do 90 pulsars relate?

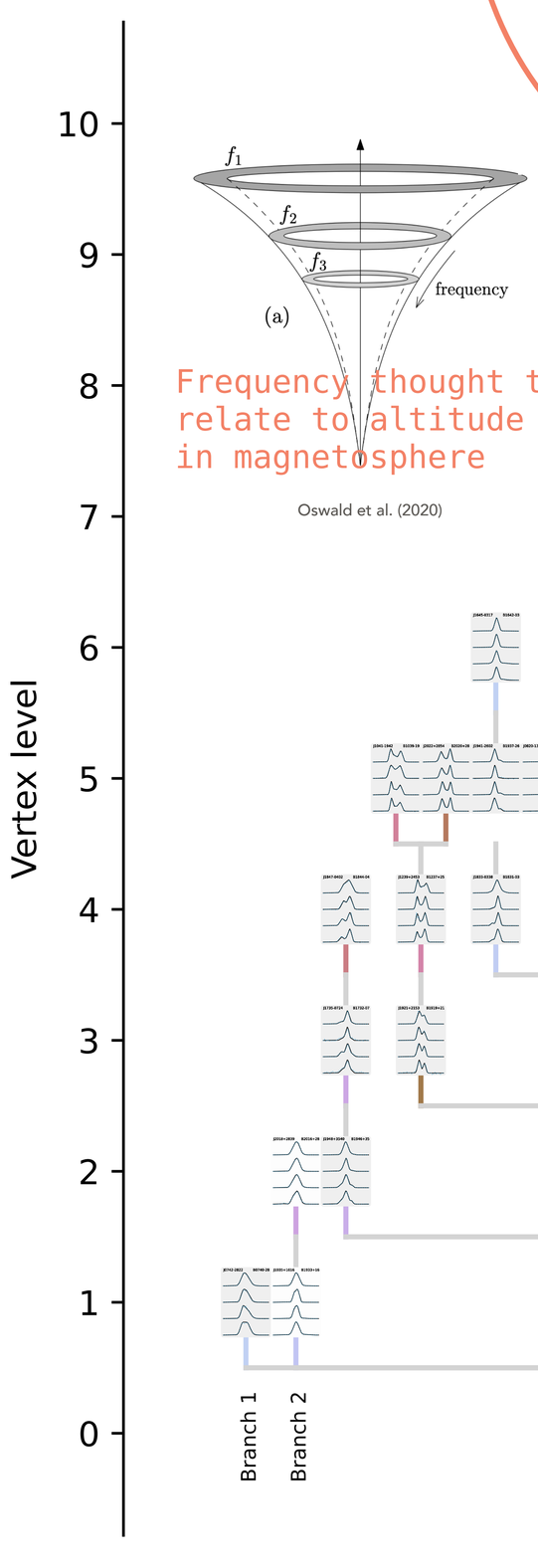
We use graph theory to investigate the European Pulsar Network database.



Sequencing highlights morphology evolution across pulsars

Minimum Spanning Tree on *w*

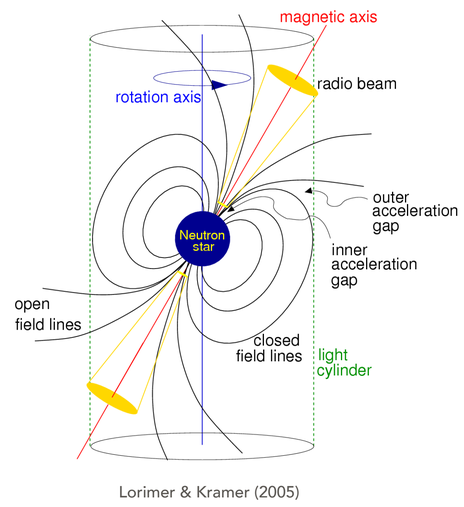
(organizes pulsars by spectro-temporal morphology)



Frequency thought to relate to altitude in magnetosphere

Oswald et al. (2020)

Make sure to zoom in!



Lorimer & Kramer (2005)

We can relate graph regions to physical parameters