

# Probing jet asymmetries

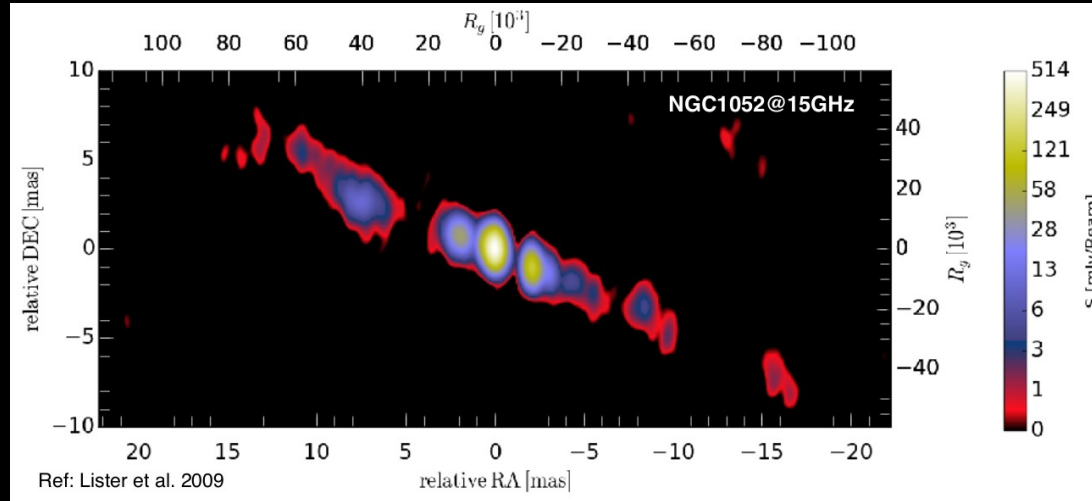
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FRANCI meeting 2022

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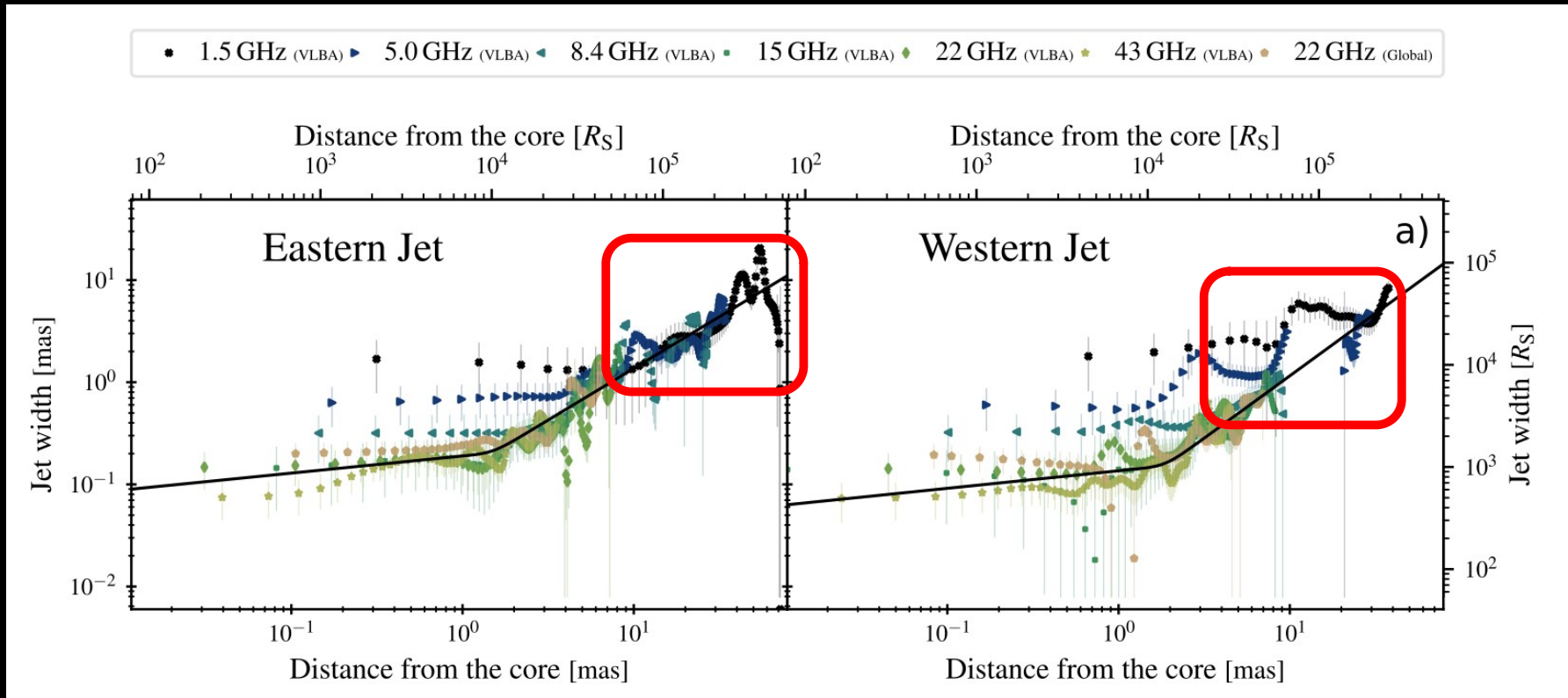


# NGC 1052

- NGC 1052 hosts an AGN with two visible jets.
- Emission gap at cm-wavelengths due to free-free absorption in the surrounding optically thick torus.
- Of interest for the study of jet asymmetry, as both jets are visible and oriented in a way that avoids differential Doppler boosting.
- Observed with the VLBA/GMVA/EHT in frequencies from 1.5 to 230 GHz at a  $\sim 80^\circ$  viewing angle.



# Asymmetries in NGC 1052



Clear asymmetry between jets

# Simulations

Jet model

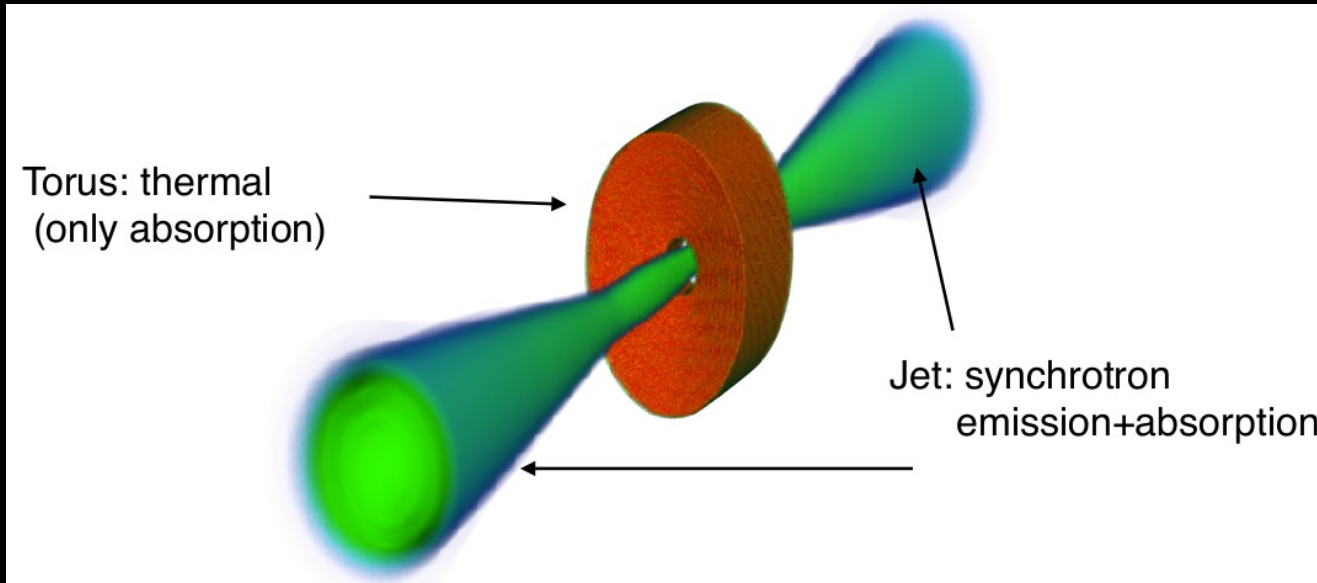
Torus model

Emission model

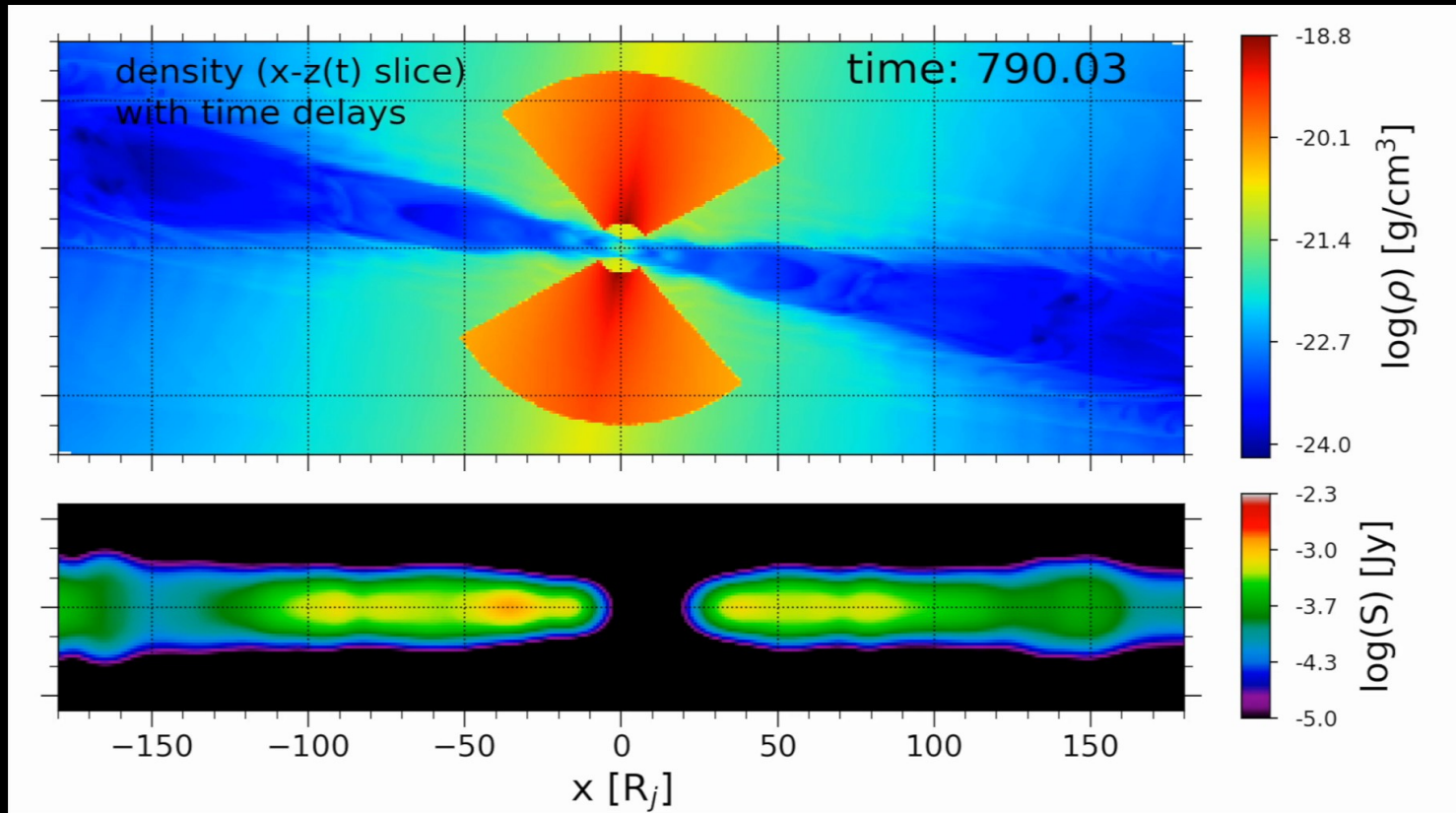
RMHD, plasma dynamics

Disk with a wide opening angle

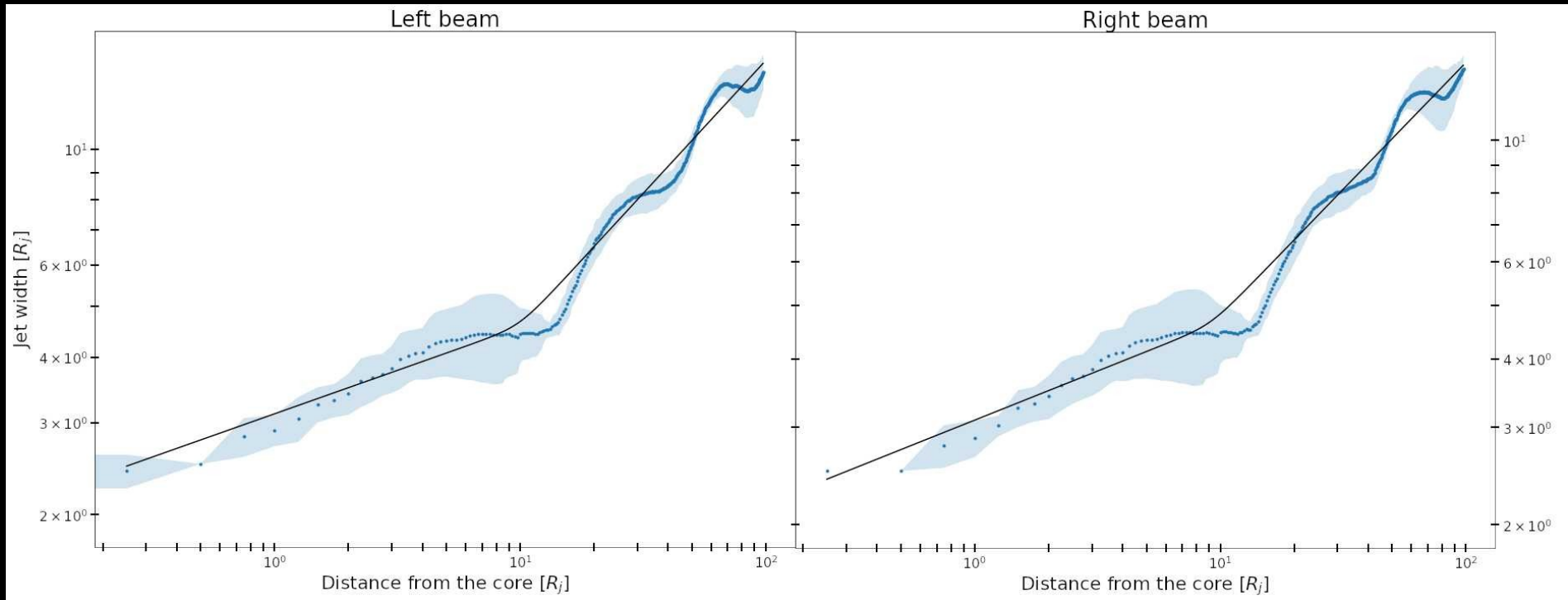
Thermal, non-thermal



# Simulations



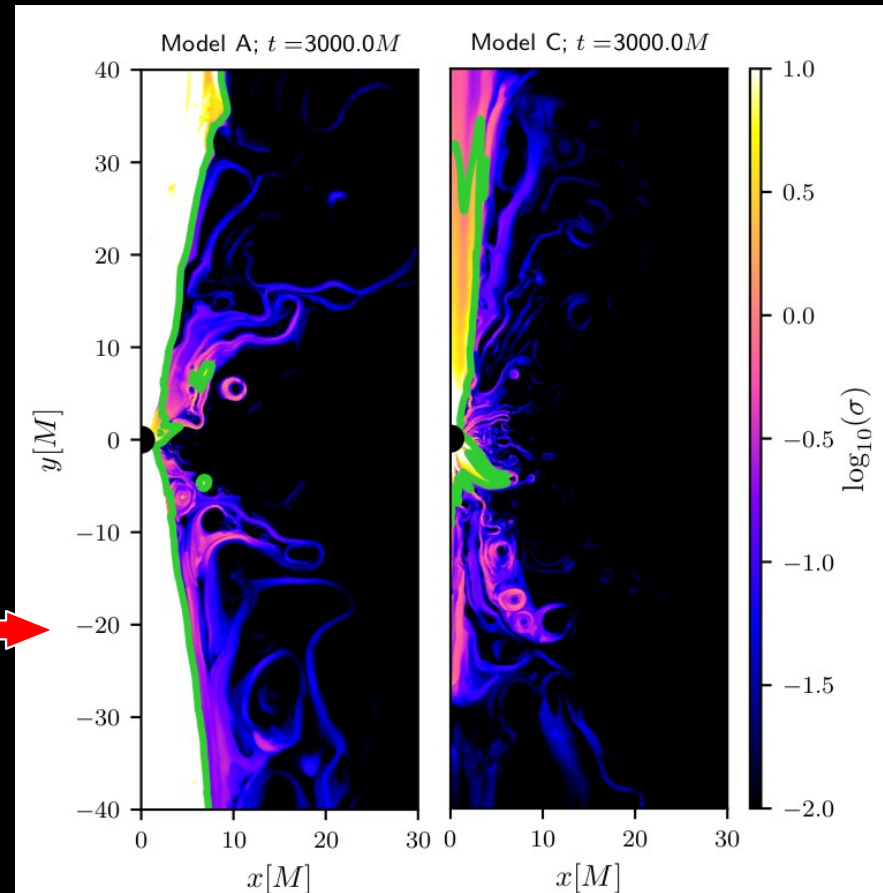
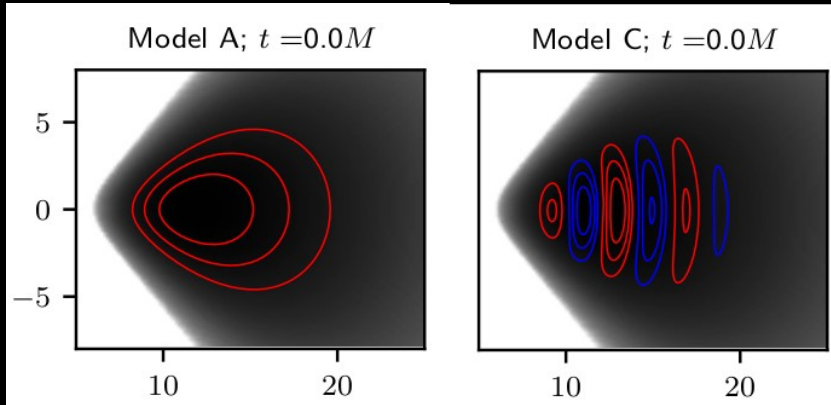
# Results of time delays



→ Numerical data is nearly symmetric.

# Asymmetric jet formation?

GRMHD launching simulations, including GR radiative transfer.



# Summary

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- Observation of asymmetric jet NGC 1052.
- RMHD simulations of jet-torus model, including perturbations, accounting for time delays → not asymmetric enough.
- Future: GRMHD simulations of the jet launching process. A multi-loop structure of the magnetic field?