INQUIRING THE DYNAMICAL SIGNATURES OF GIANT VORTICES IN PROTOPLANETARY DISKS

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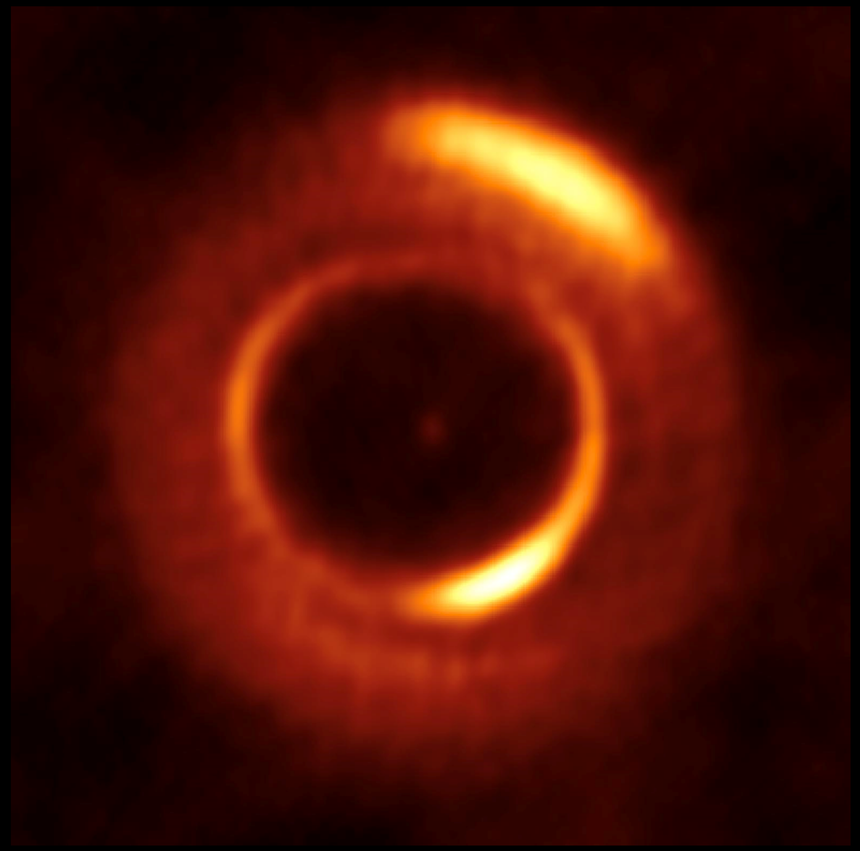
SF2A — 15/05/2019

MENU

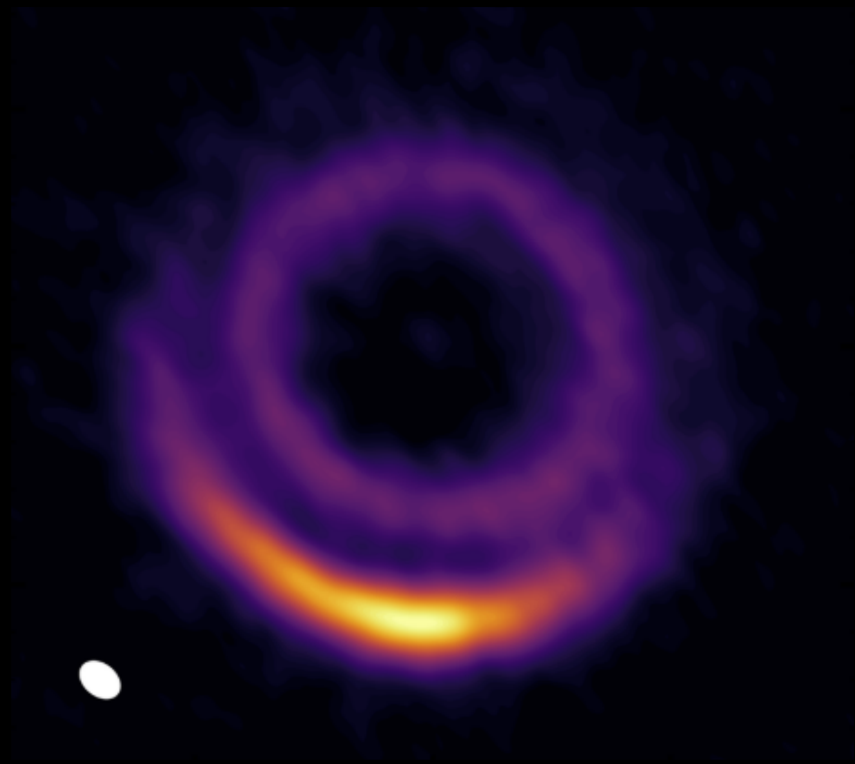
1. Intro : an observational context for ***Elongated Blobs*** (vortices ?)
2. Hydro modeling and continuum emission
3. Molecular emission

CONTEXT: BLOBS

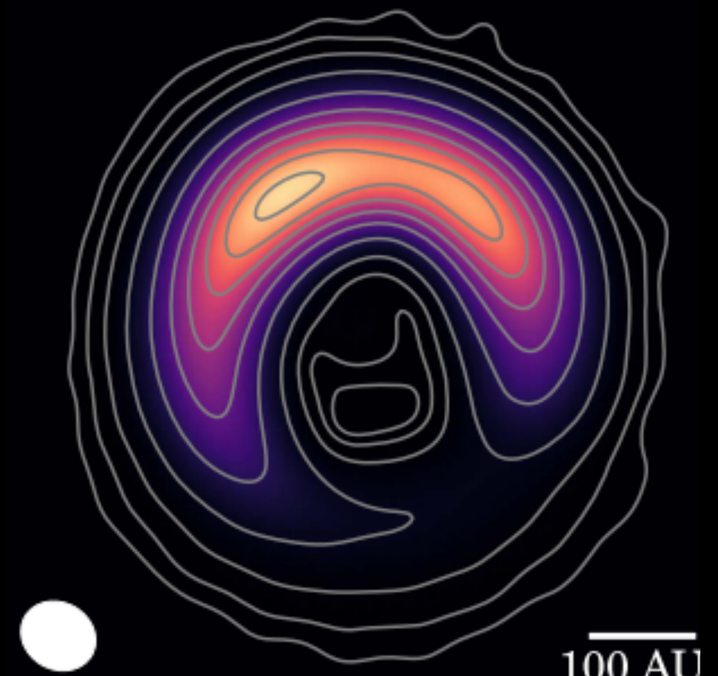
GIANT CRESCENTS IN OBSERVED DISKS



MWC 758



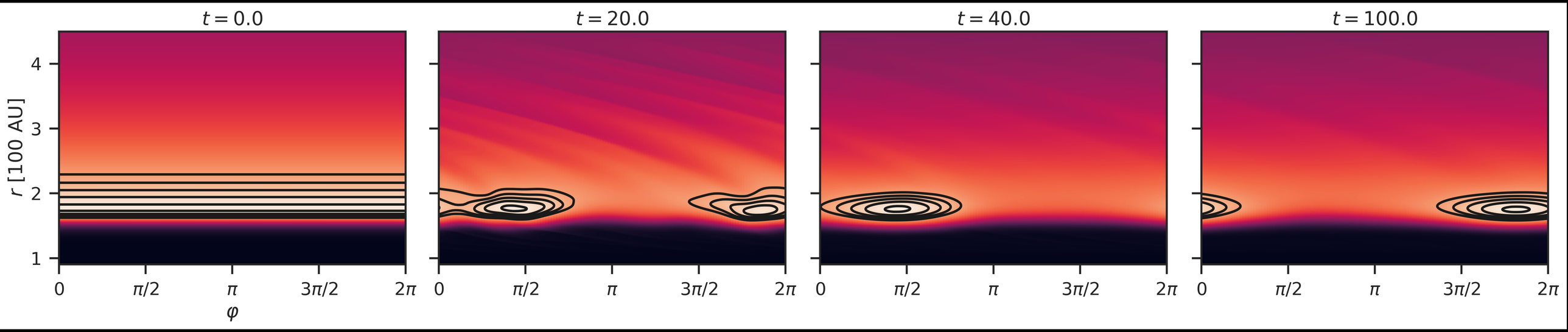
HD 13544B
(1.9 mm)



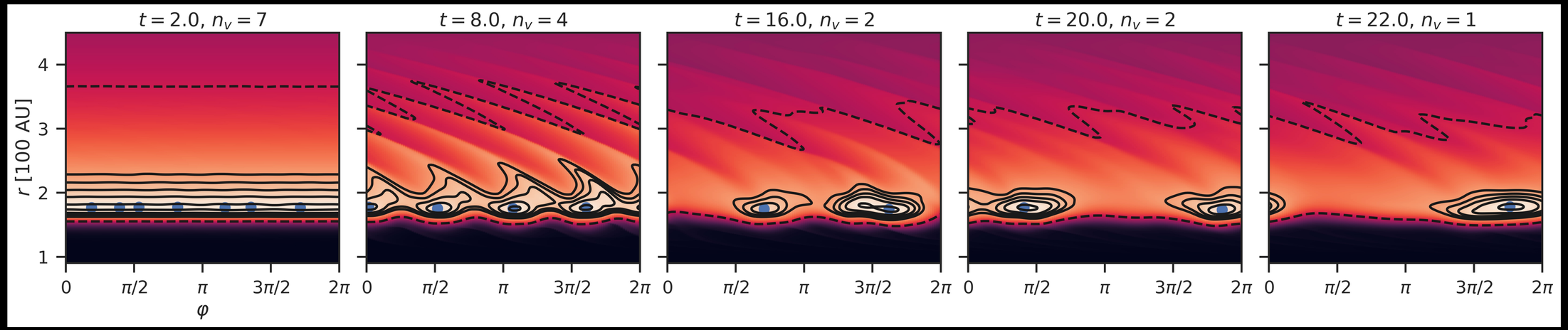
HD 142 527
(polarized emission)

MODEL: HYDRO

ROSSBY-WAVE INSTABILITY



SURFACE DENSITY EVOLUTION OVER 100 ORBITS



A CLOSER LOOK AT THE MERGER

MODEL: HYDRO

MULTIPLE DUST TRACERS

$$\mathrm{St} = t_s \Omega \propto s_p$$

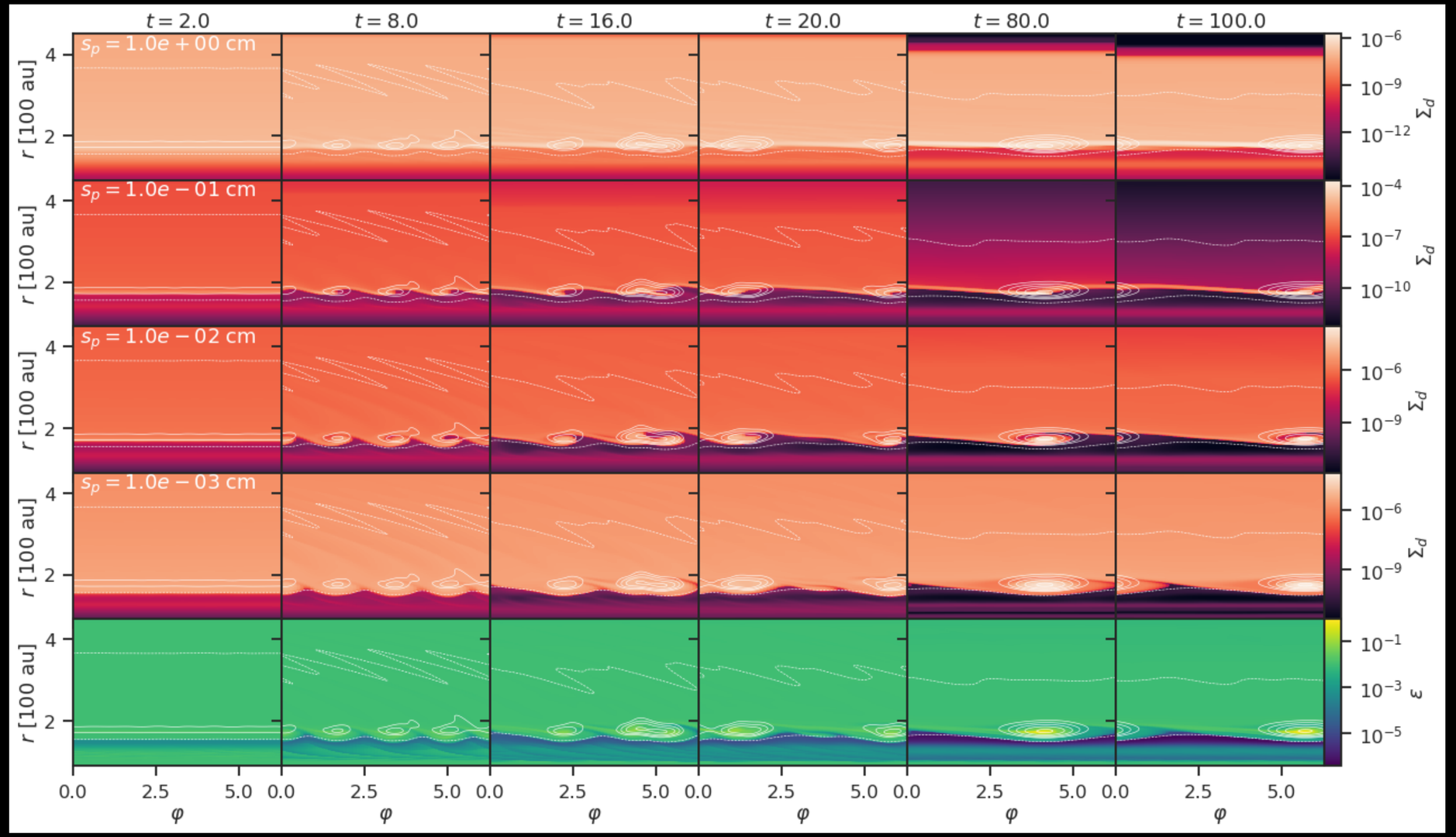
sp = 1cm

sp = 1mm

sp = 100μm

sp = 10μm

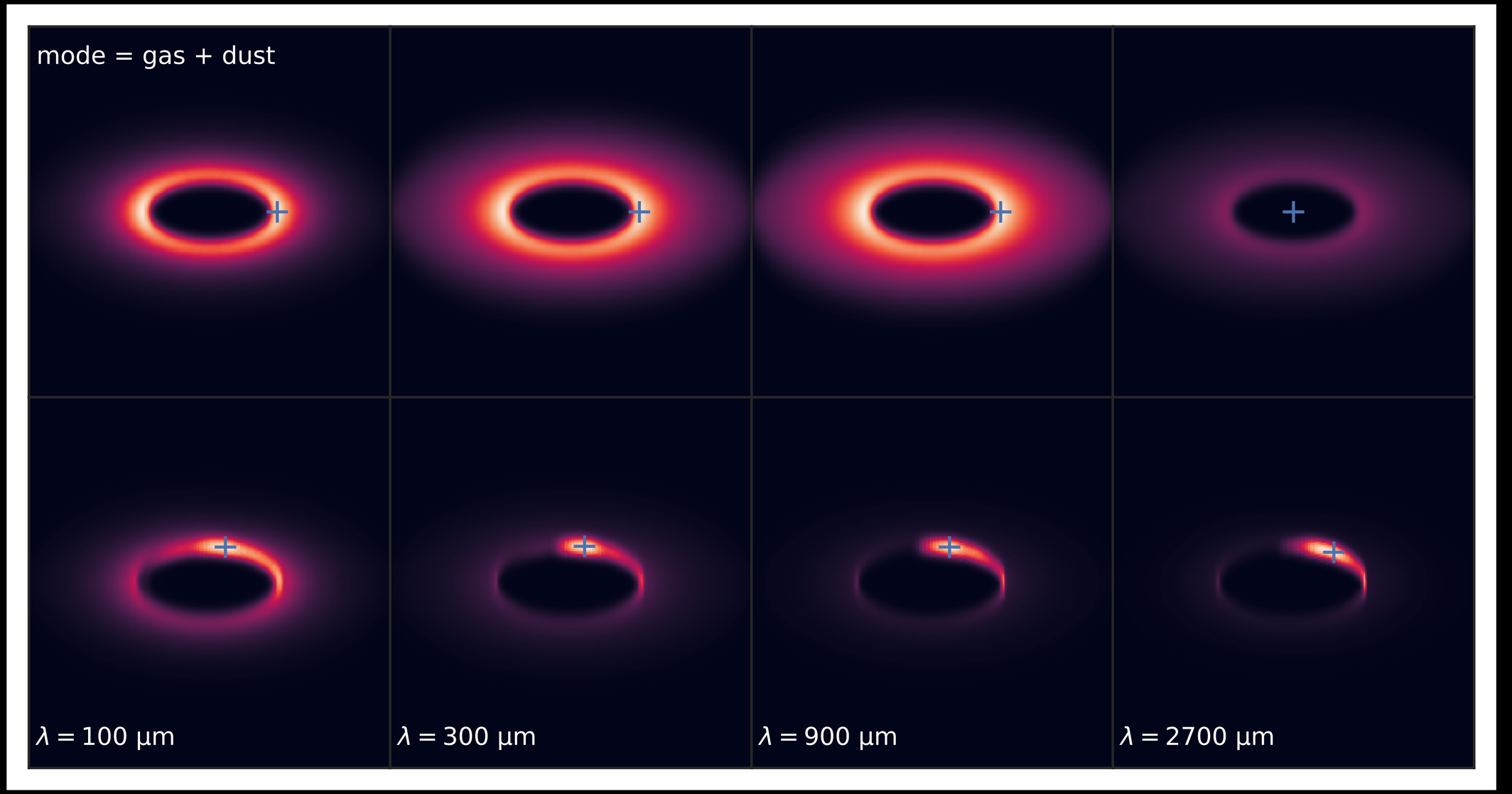
Dust to gas mass ratio



DUST POPULATIONS ACCUMULATE ON DIFFERENT TIMESCALES

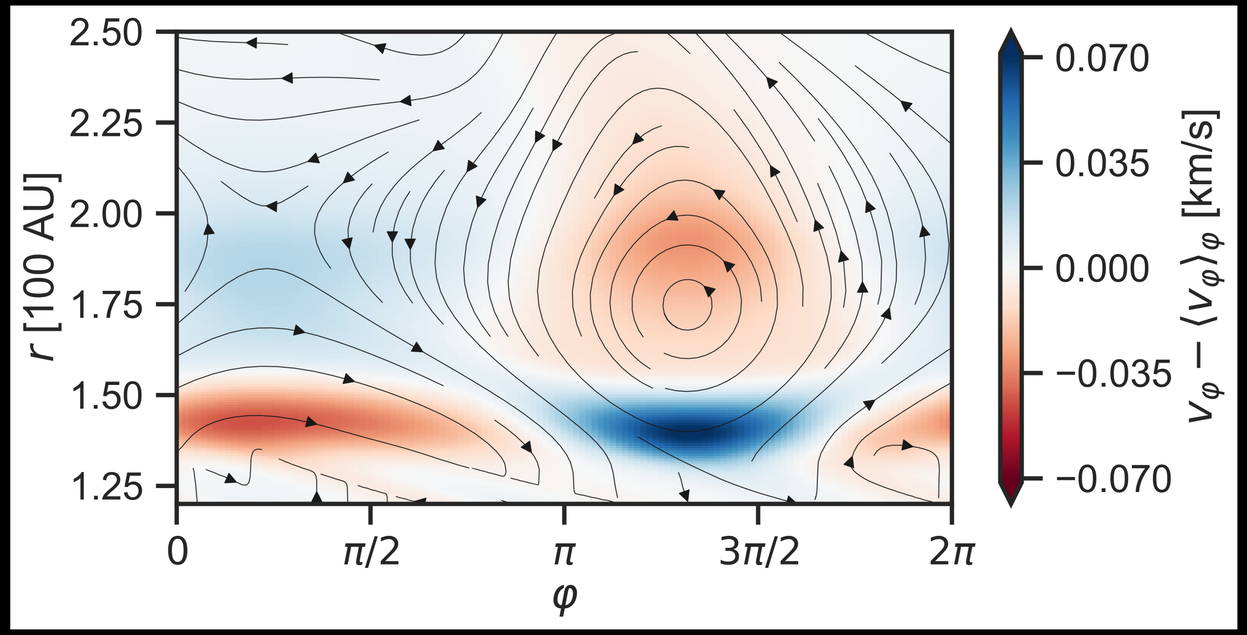
MODEL: RT

SYNTHETIC IMAGING: SIMULATING CONTINUUM (ALMA)

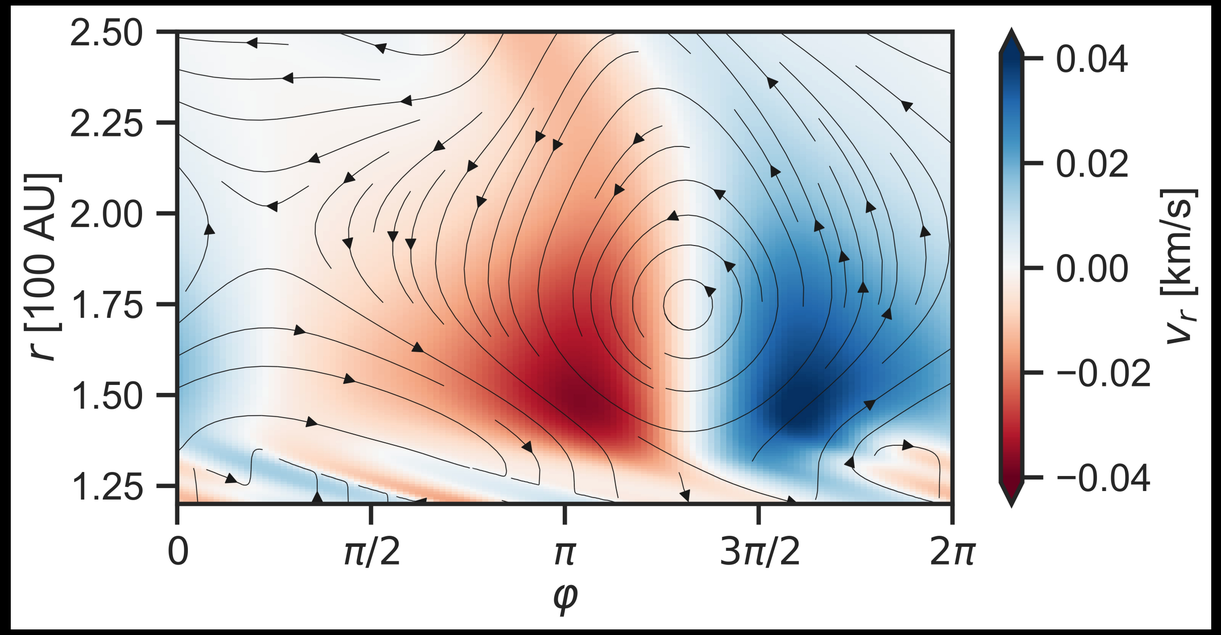


MODEL: HYDRO

DYNAMICAL SIGNATURES FROM HYDRO MODELS



Azimuthal velocity (local average removed)

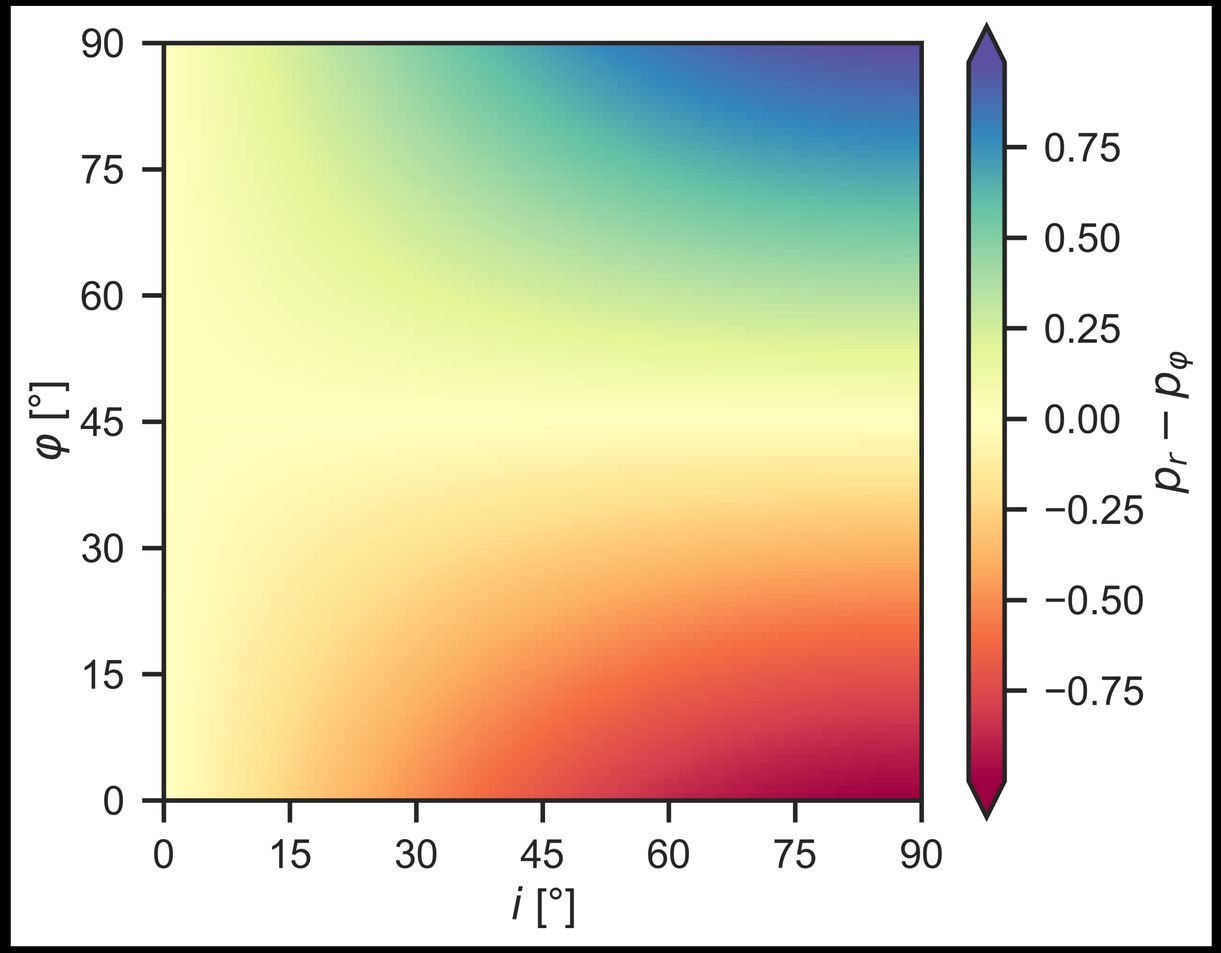


Radial velocity

THE OBSERVATIONAL CHALLENGE IS IN GENERAL TO SEPARATE THEM

MODEL: HYDRO

DYNAMICAL SIGNATURES FROM HYDRO MODELS



PROJECTED VELOCITY IS IN GENERAL A MIX BETWEEN RADIAL AND AZIMUTHAL COMPONENTS

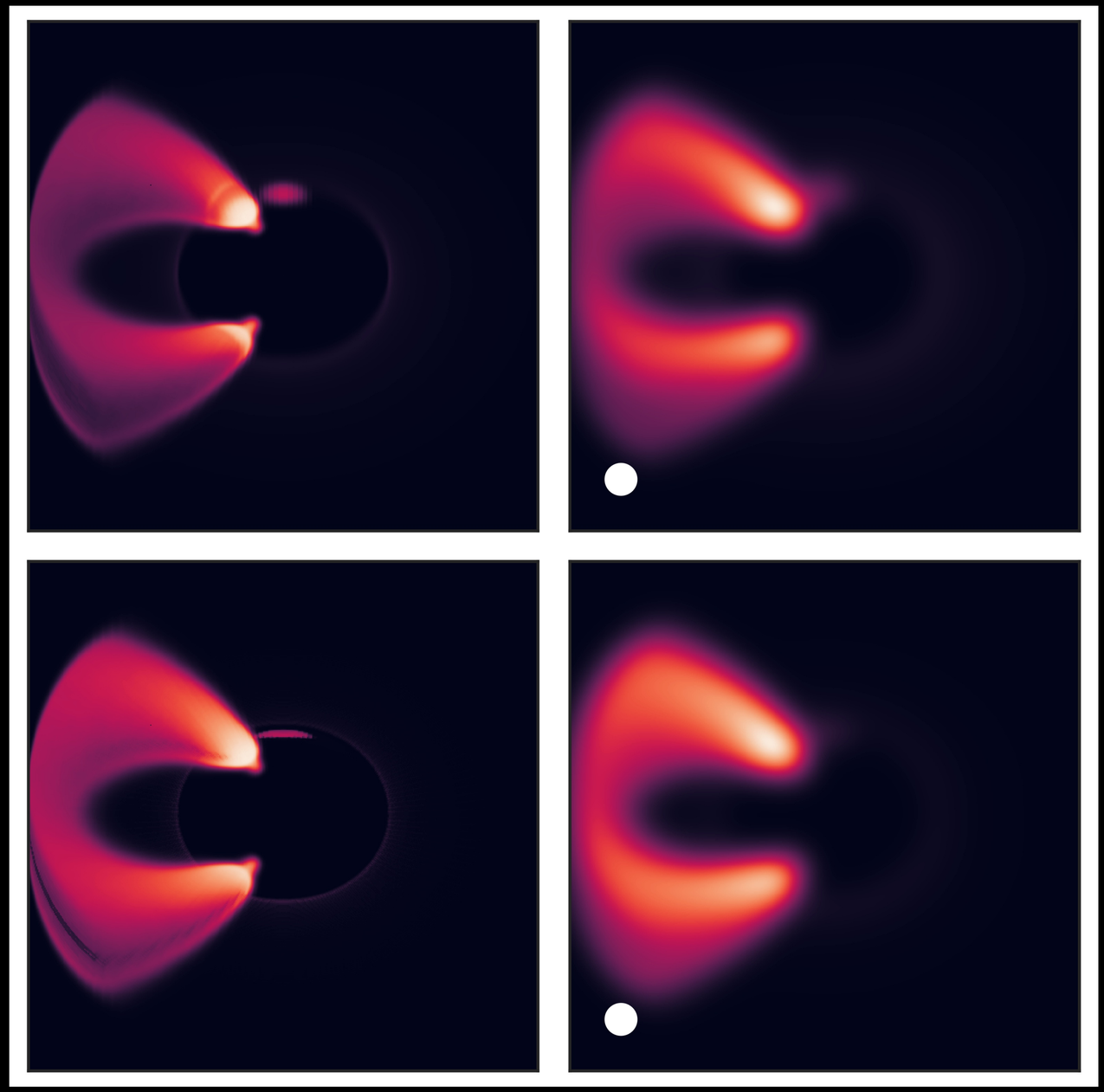
Blue : radial velocity dominates

Red : azimuthal velocity dominates

Yellow : worst degeneracies

(DYNAMICAL) SIGNATURES IN MOLECULAR EMISSION (?)

Upper row: no settling
Lower row: Dubrulle-like settling
Left: synthetic images
Right synthetic observations (beam added)



Navigating around a molecular line (13CO J3-0)

THANKS