High-angular resolution observations of HD179218: Early stages of disk dissipation?

J. Kluska

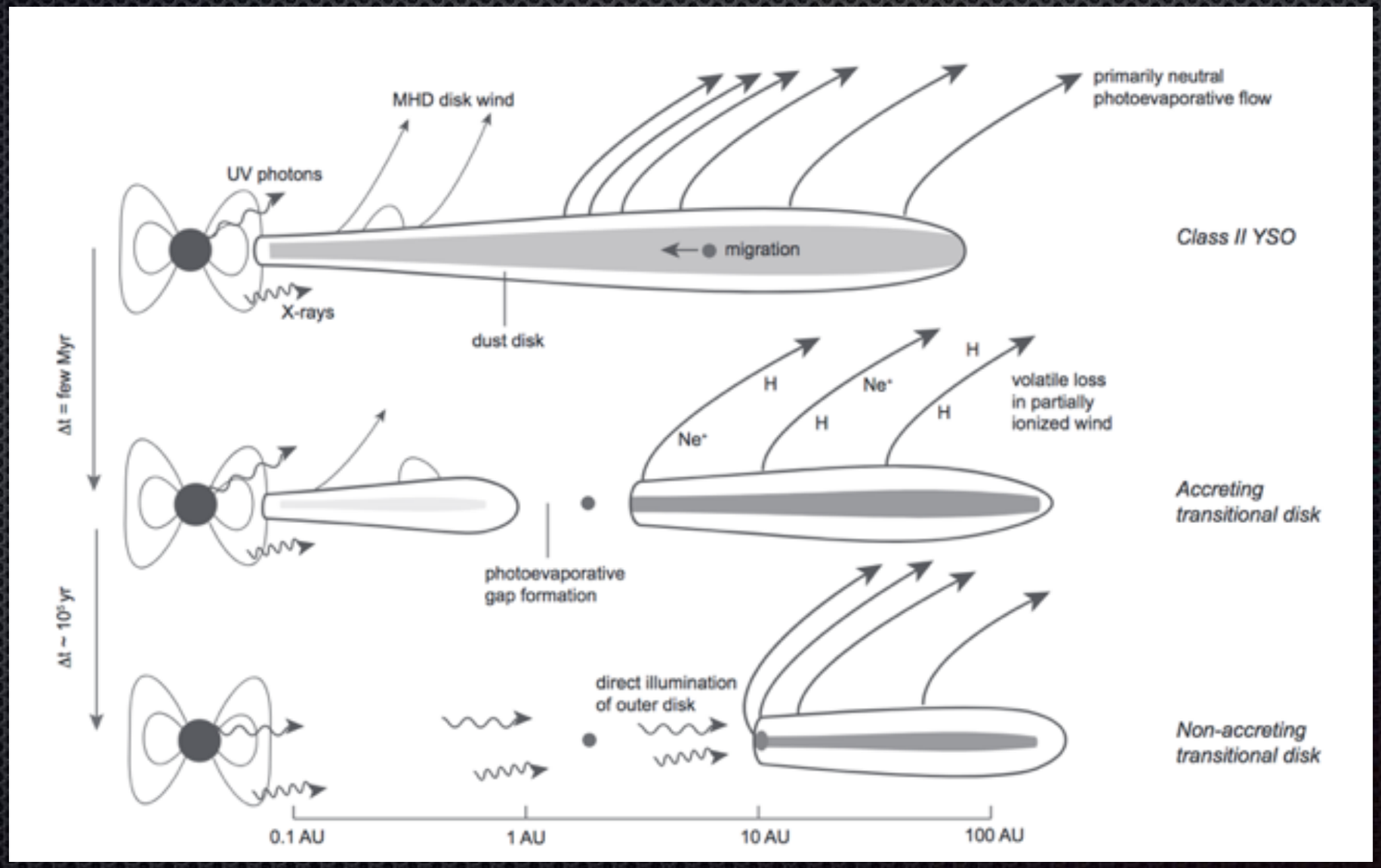
S. Kraus, C. L. Davies, T. Harries, M. Willson, J. D. Monnier, A. Aarnio, F. Baron, R. Millan-Gabet, T. ten Brummelaar, X. Che, S. Hinkley, T. Preibisch, J. Sturmann, L. Sturmann, and Y. Touhami

UNIVERSITY OF EXETER

KU LEUVEN

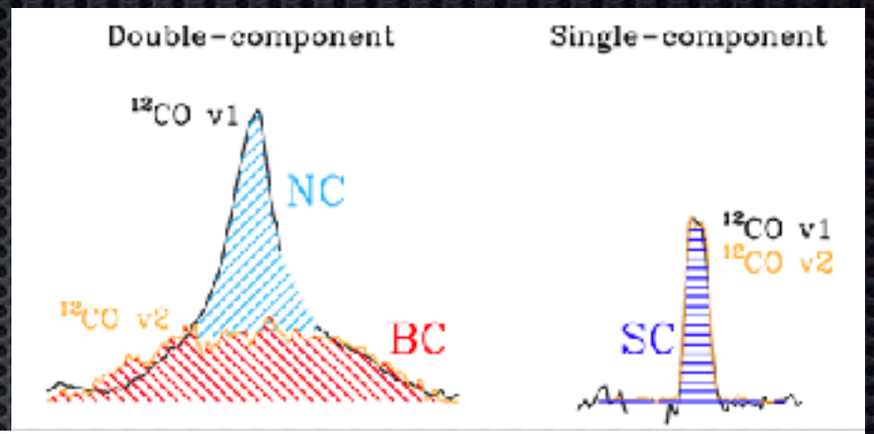
Disk evolution

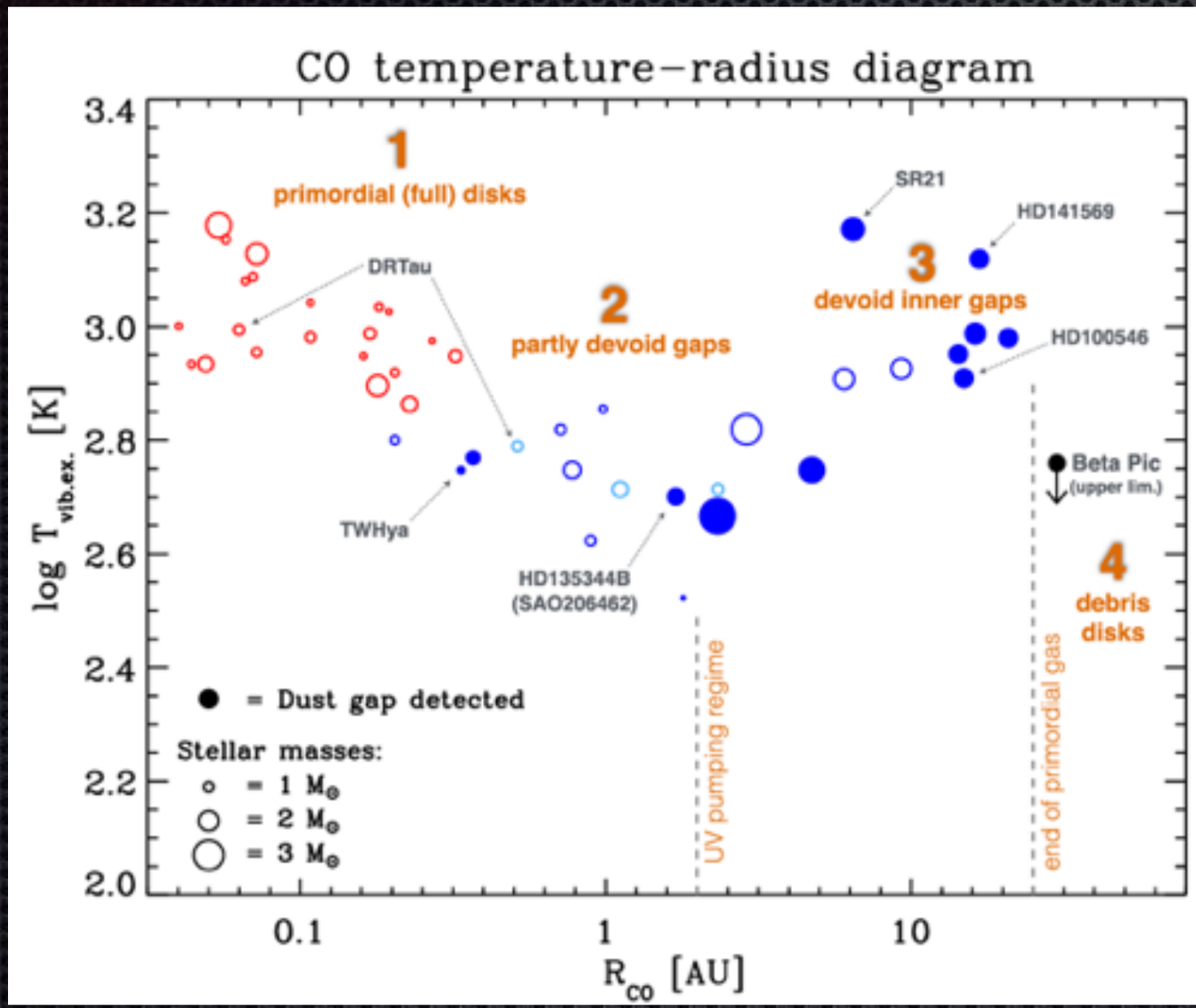
- Disk evolution —> Disk dissipation is fast: ~ 10^5yrs

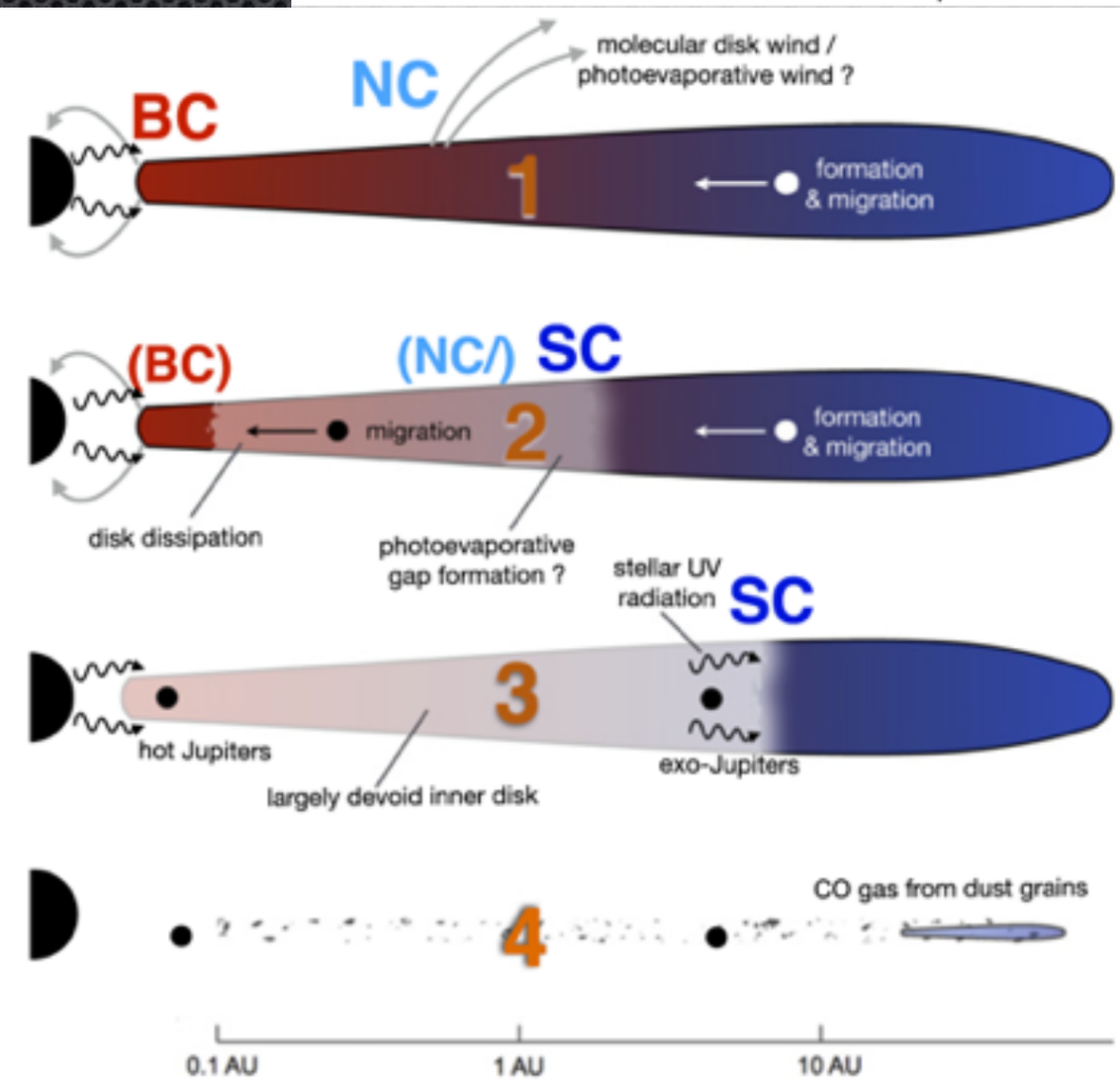


Alexander et al. 2014

Disk evolution

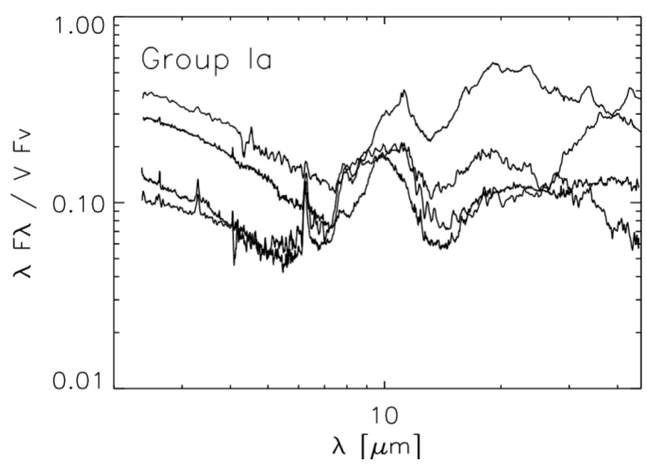


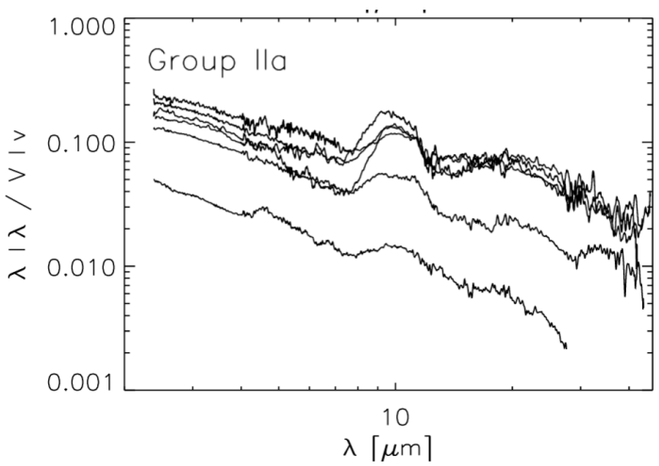


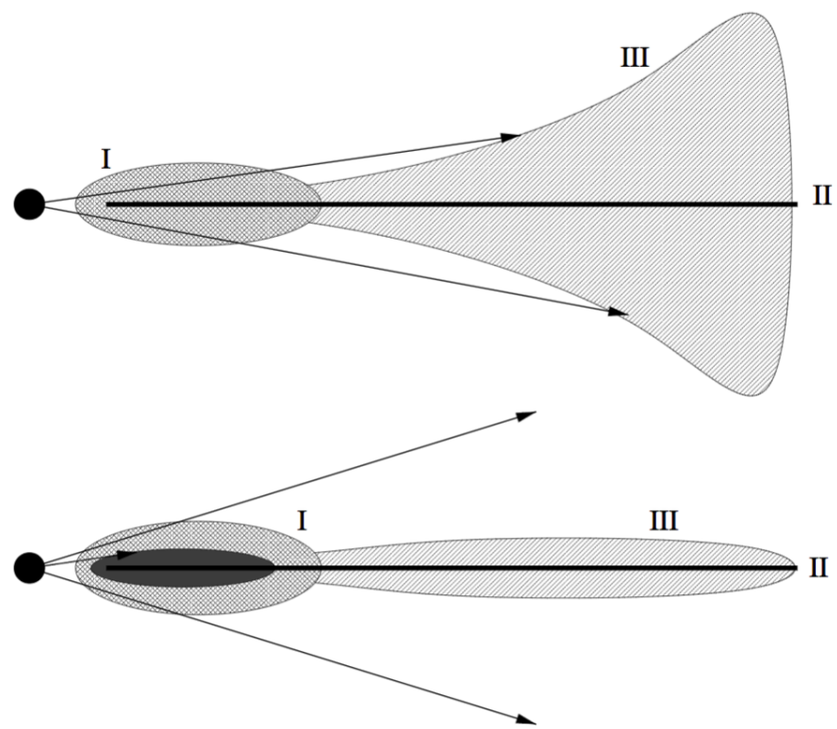


Banzatti & Pontoppidan 2015
van der Plas et al. 2015

Disk evolution around Herbig Ae/Be stars

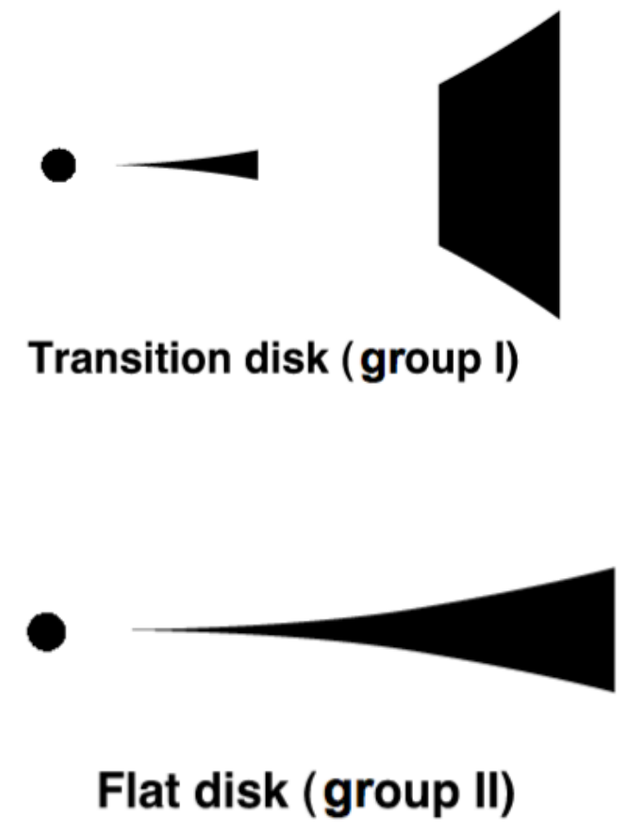






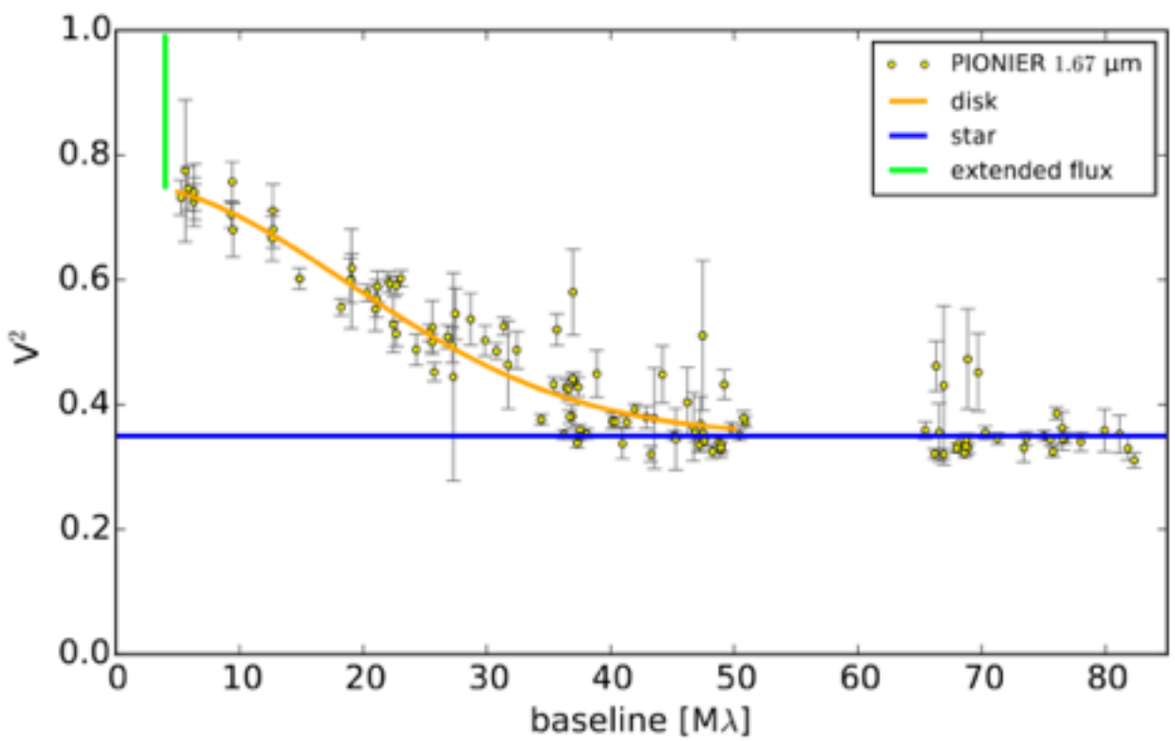
Meeus et al. 2001

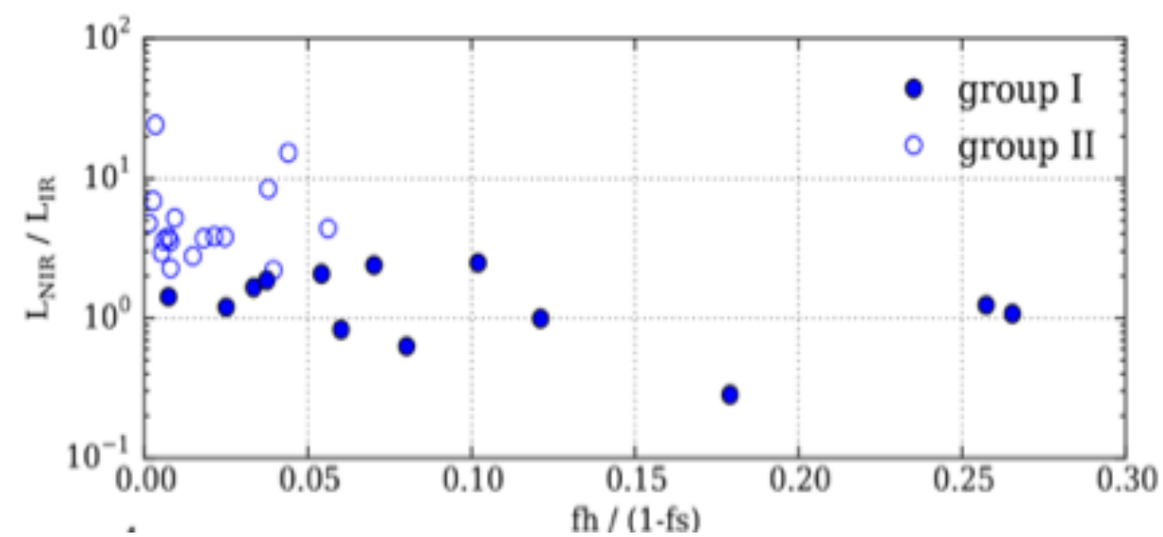
OR



Maaskant et al. 2013

Disk evolution around Herbig Ae/Be stars





Klarmann et al. 2017; Lazareff et al. 2017

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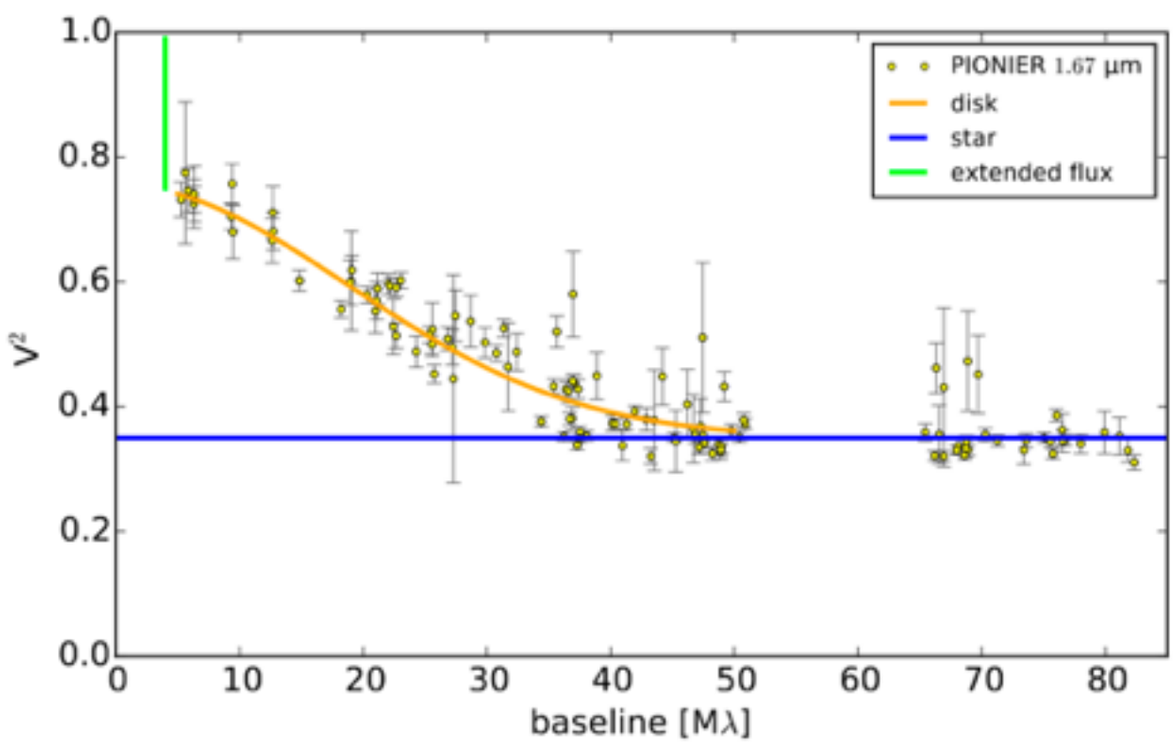

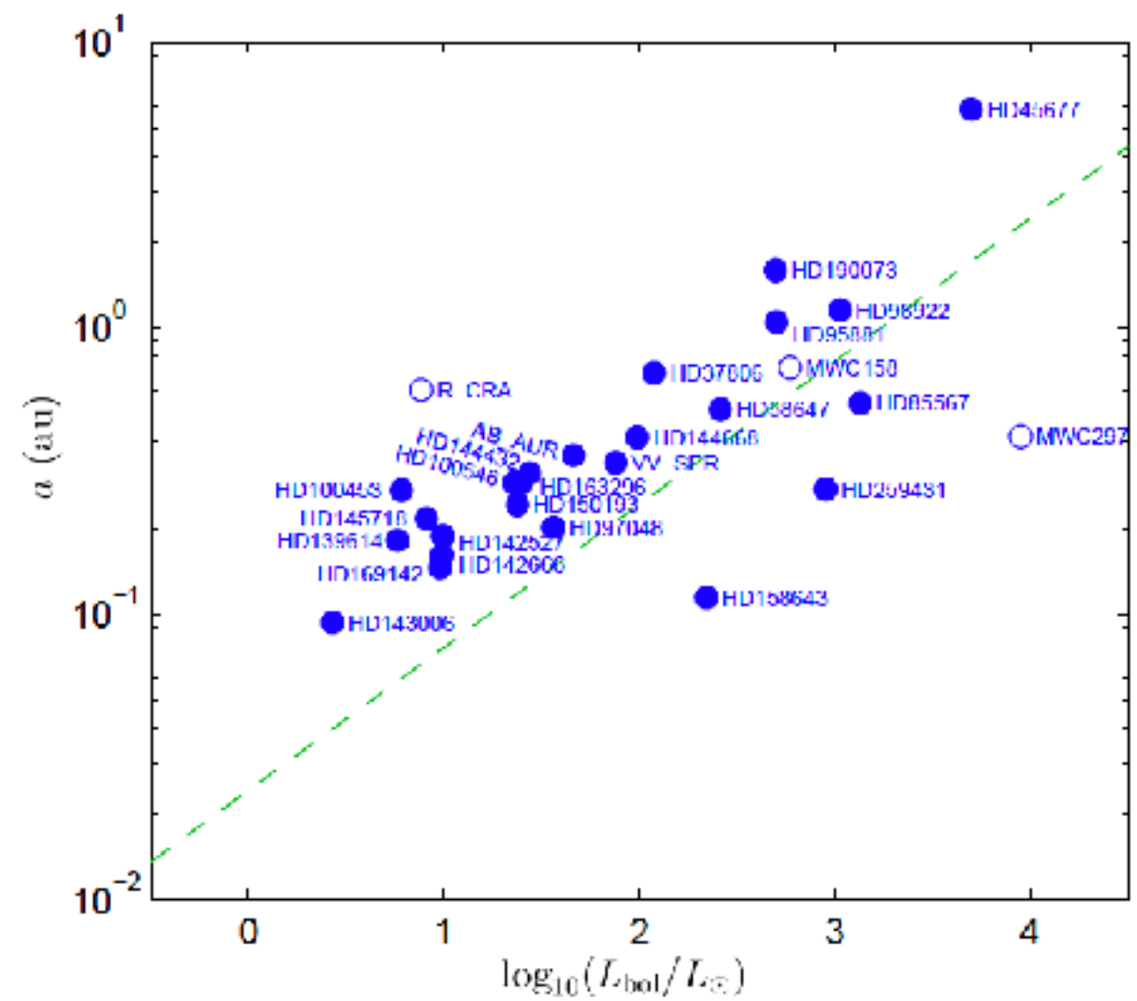

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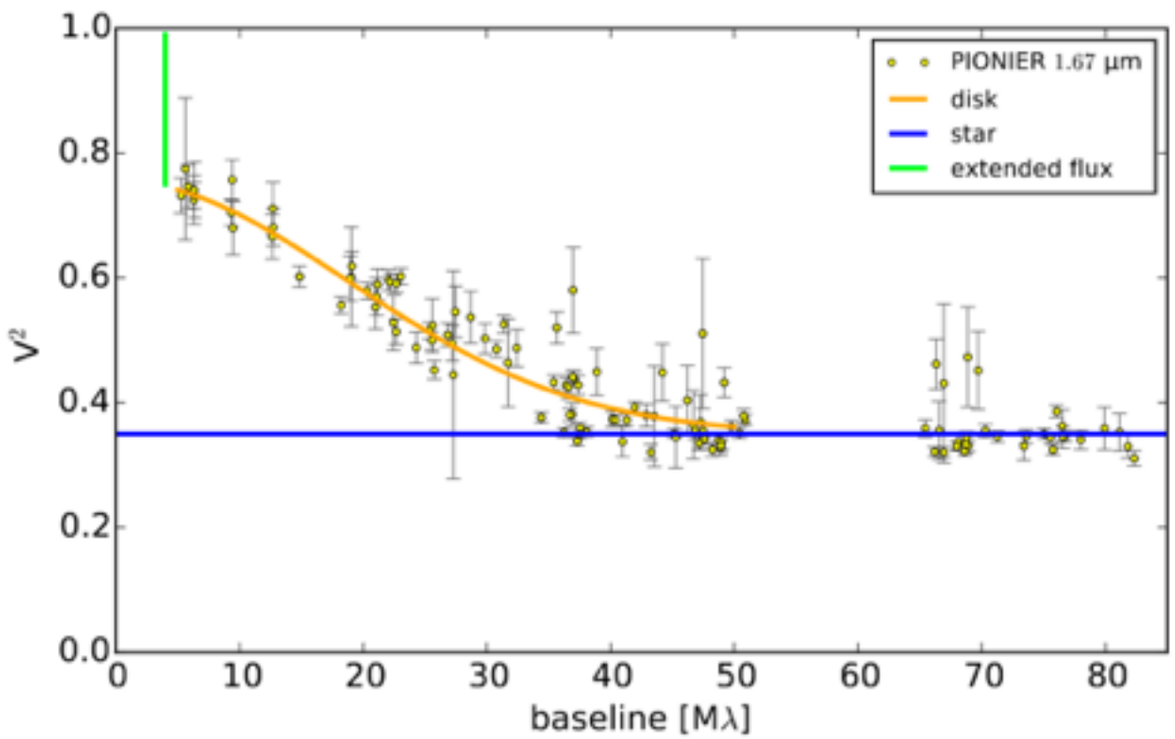

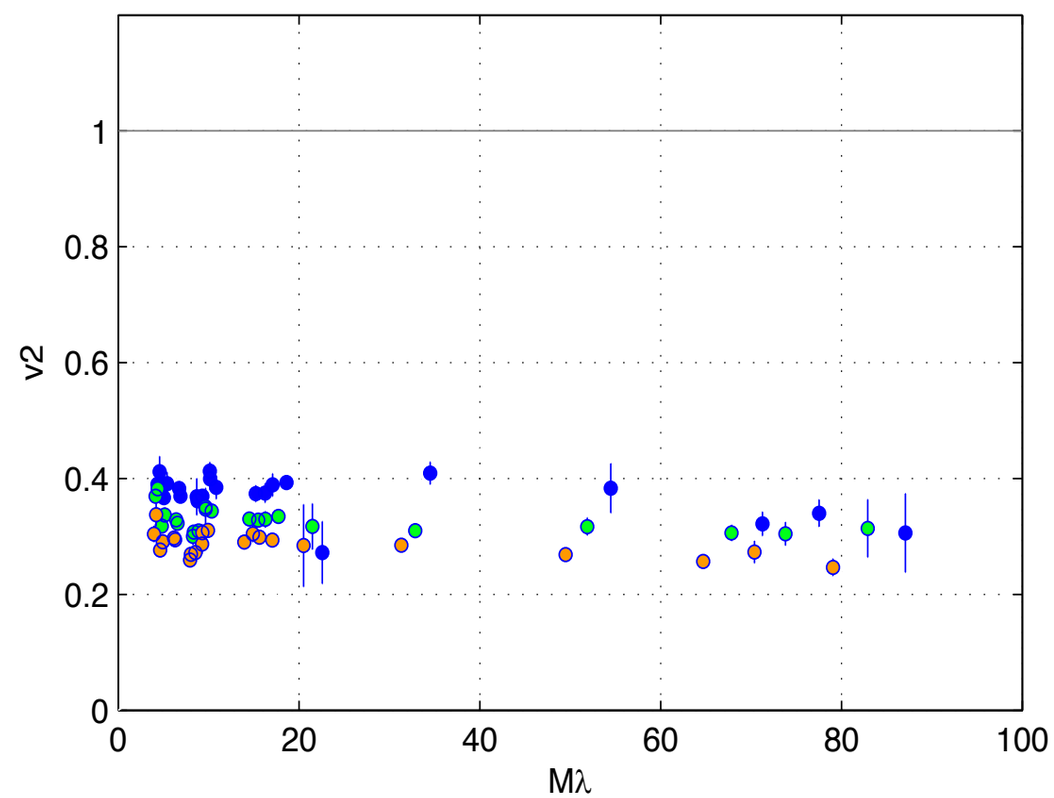

Klarmann et al. 2017; Lazareff et al. 2017

HD179218

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- Disk with cavity deduced from rovib ^{12}CO and ^{13}CO emission *(Banzatti et al. 2015)*

A high-angular-resolution observing campaign of HD179218

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    - Near-infrared (VLTI/AMBER & PIONIER, CHARA/CLIMB & CLASSIC)
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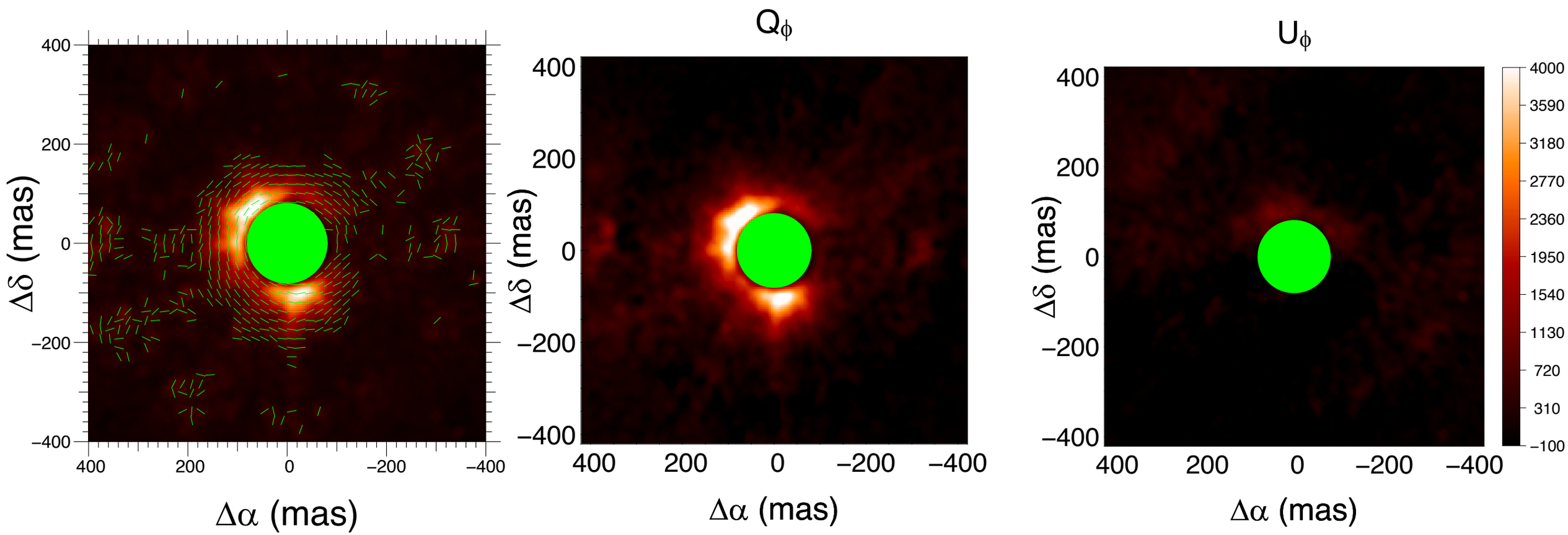
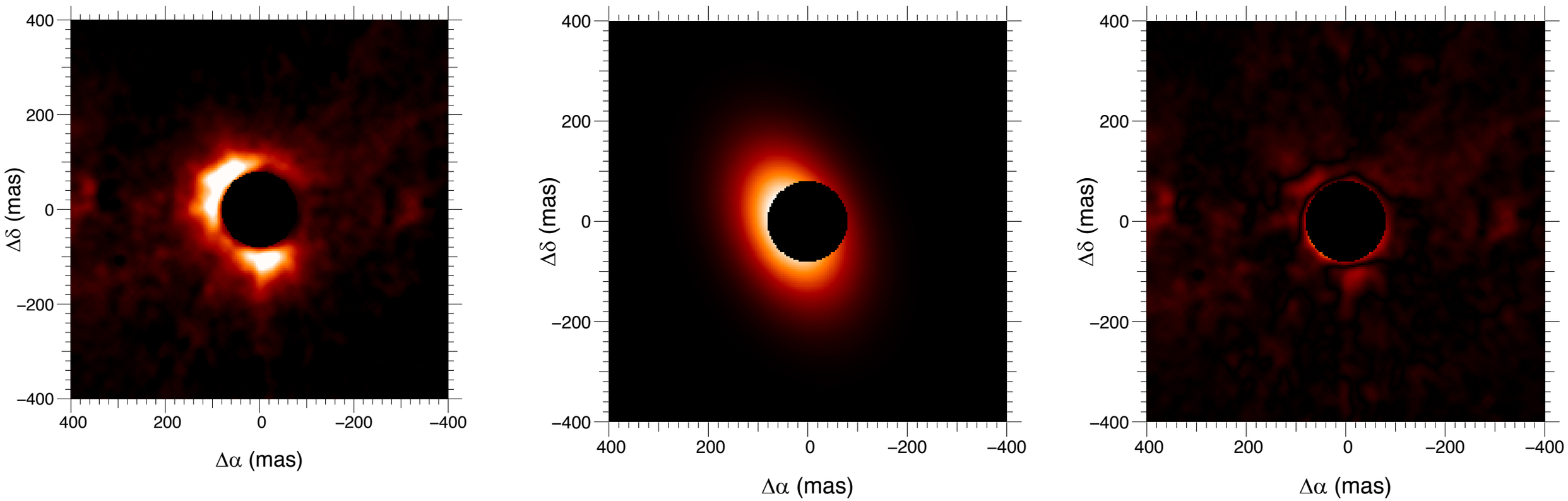


Kluska et al. 2018a

Direct Imaging (SPHERE/ ZIMPOL)



Off-centred Gaussian:

FWHM = 252.1±1.1 mas ~ 75au

i=47.4°±0.3° ; PA=24.8°±0.4°

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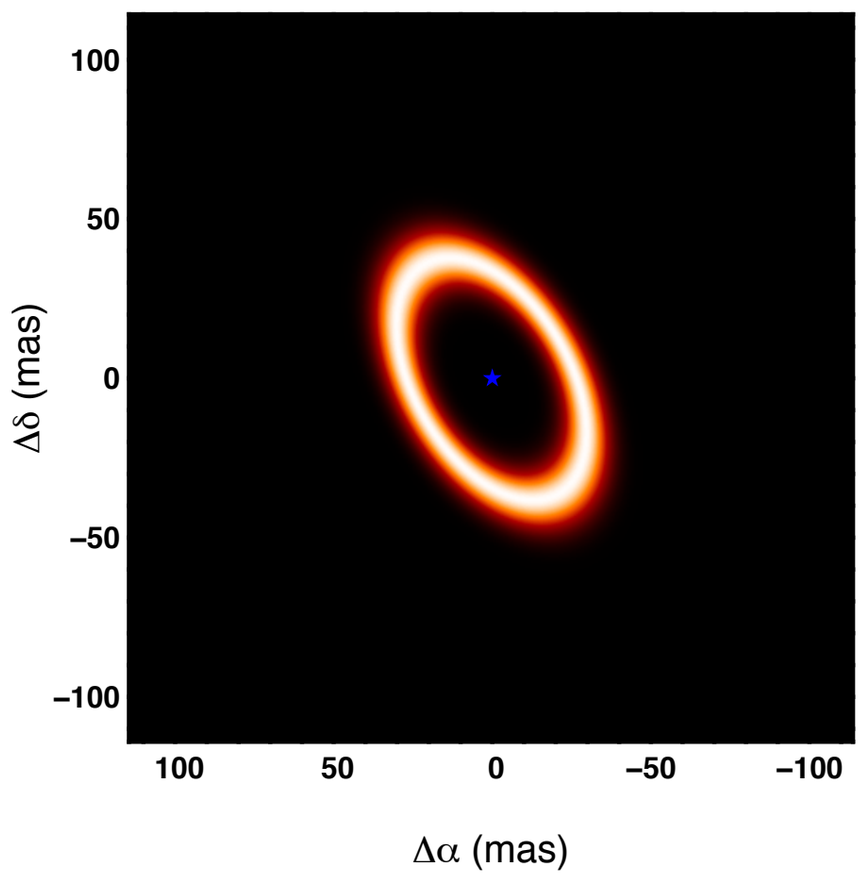
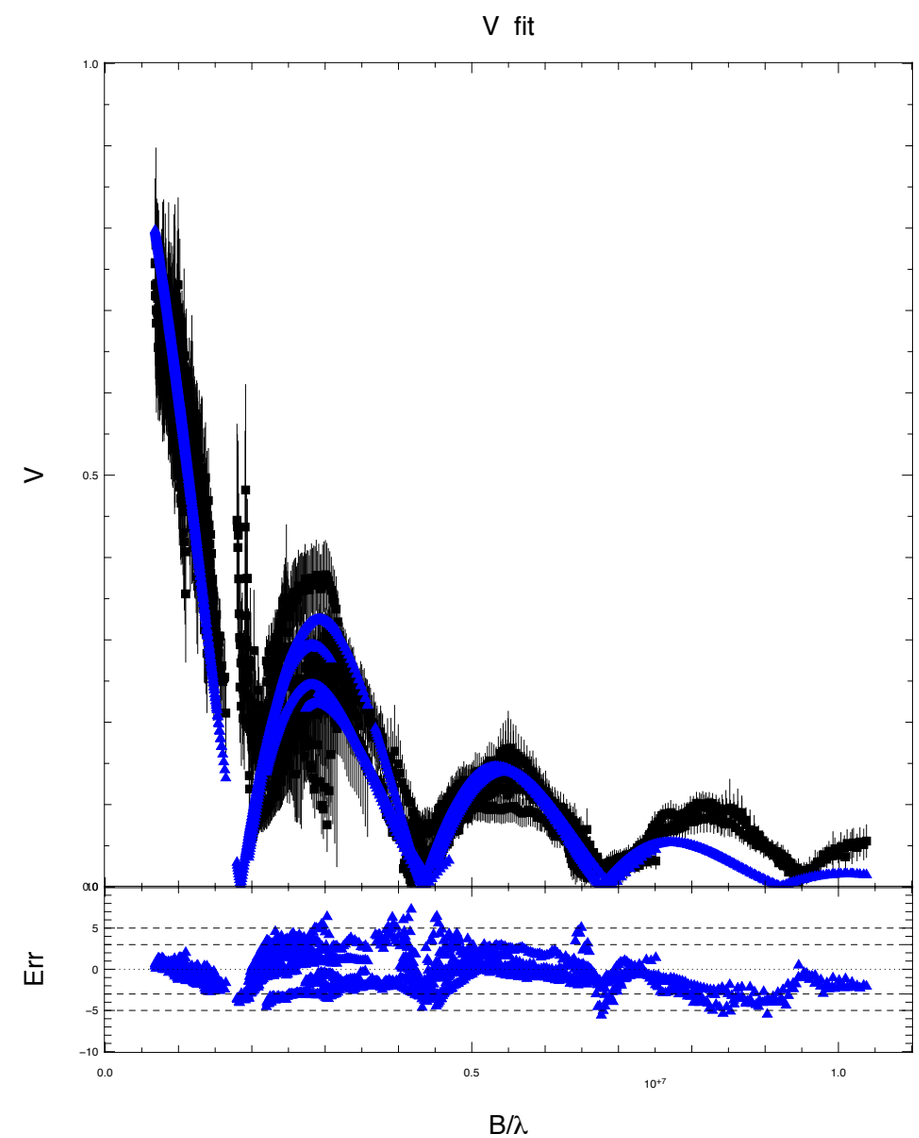
Mid-infrared interferometry (MIDI)



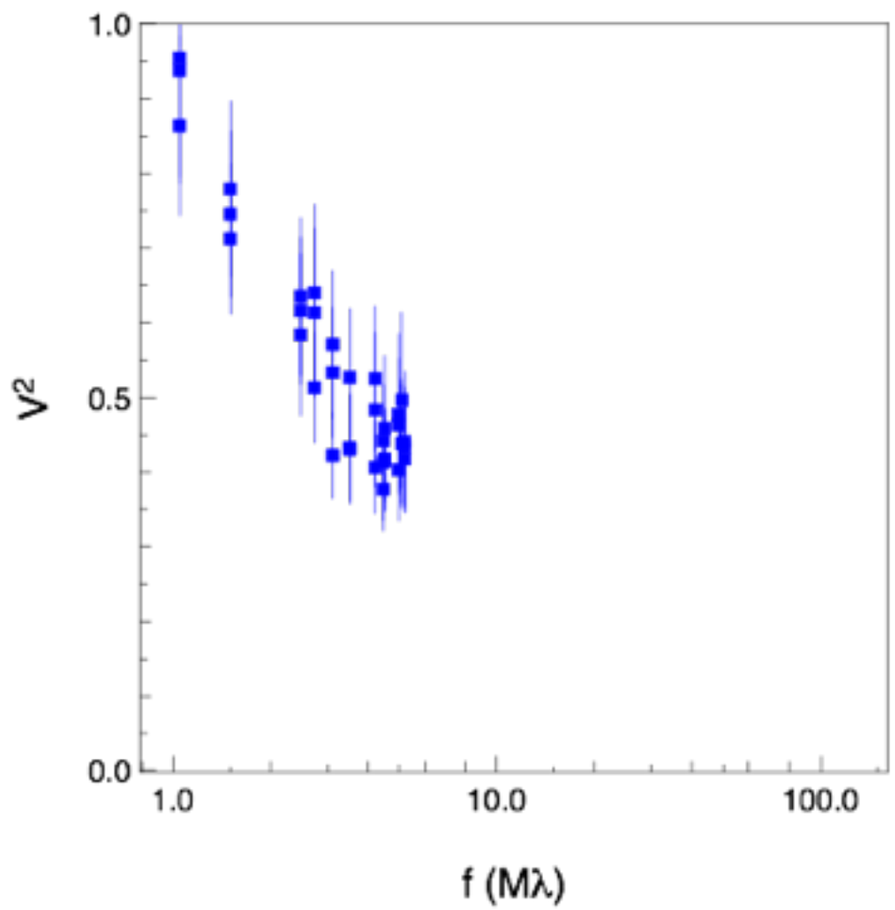
Gaussian Ring
R = 41.8±0.9 mas ~12au
i=52.5°±6.1°; PA=26.4°±6.2°

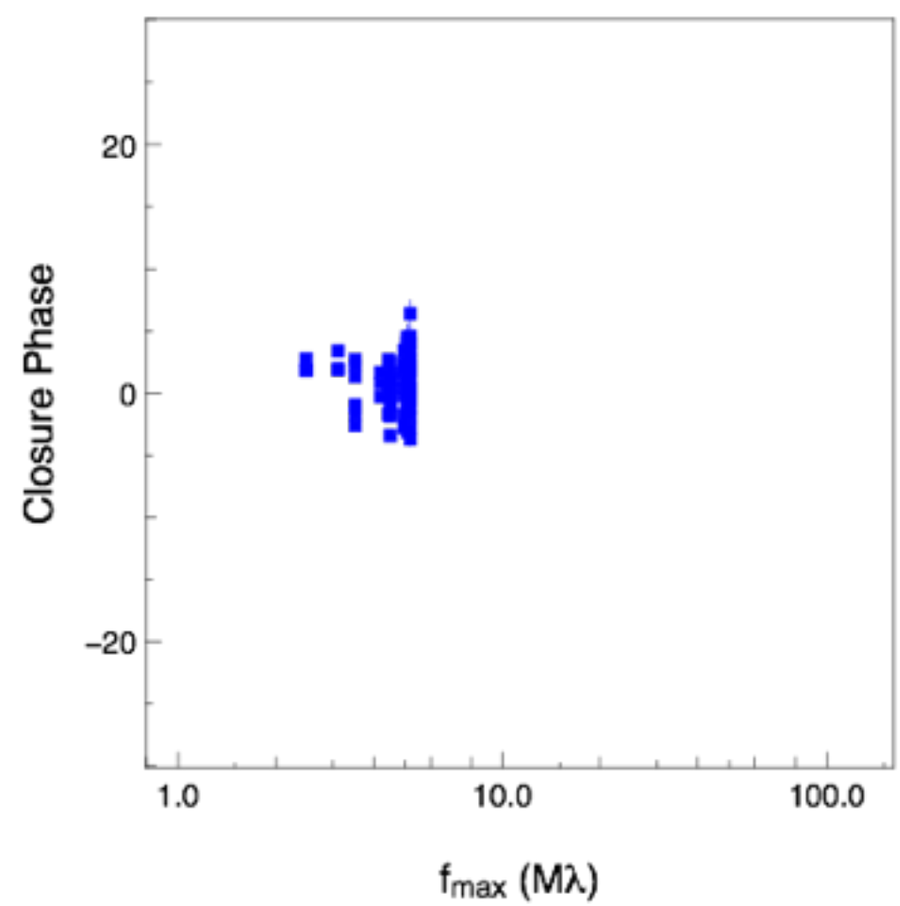


Kluska et al. 2018a

Near-infrared interferometry

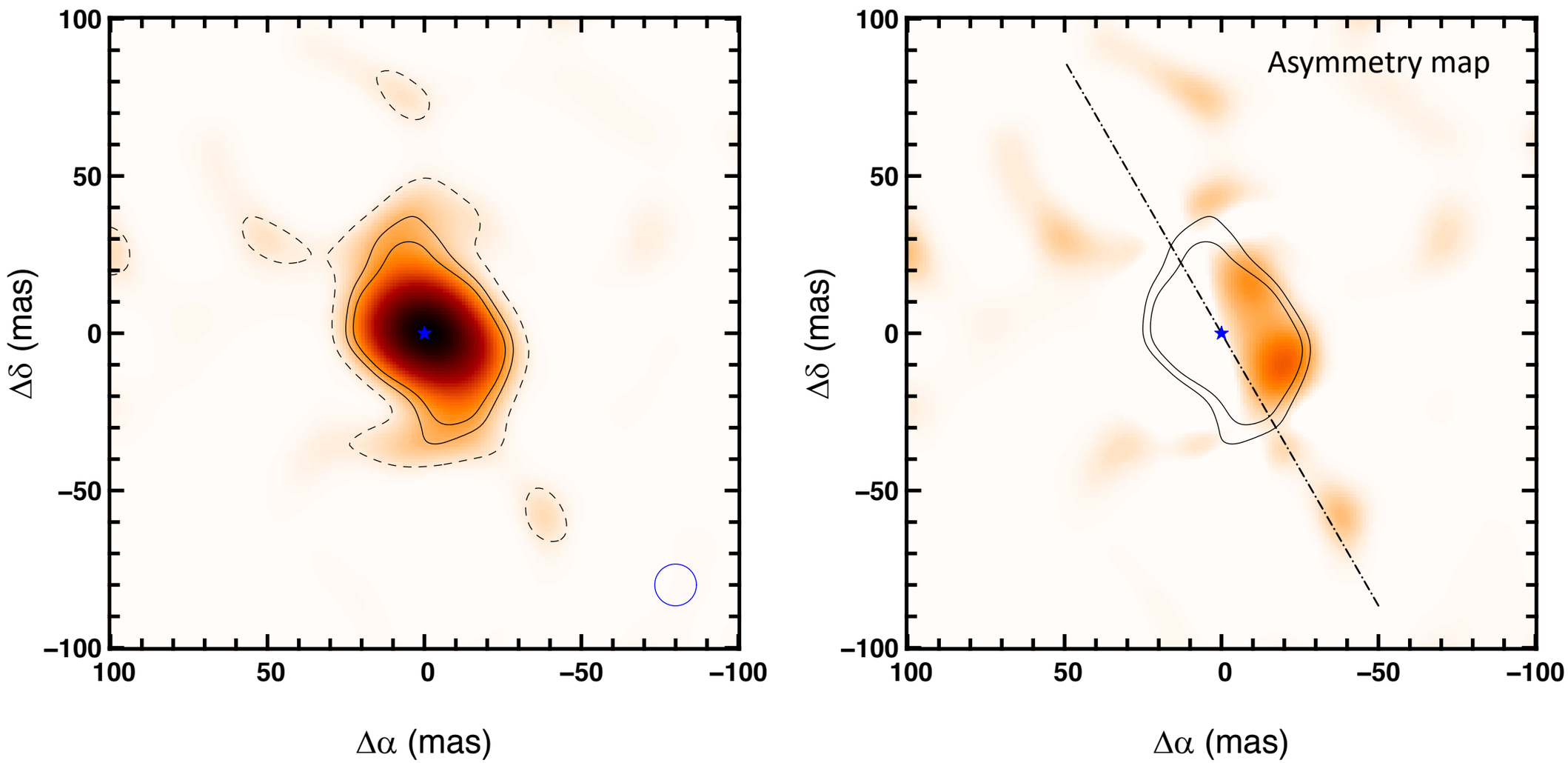
KECK/NIRC2





Kluska et al. 2018a

Near-infrared interferometry



Kluska et al. 2018a

Near-infrared interferometry

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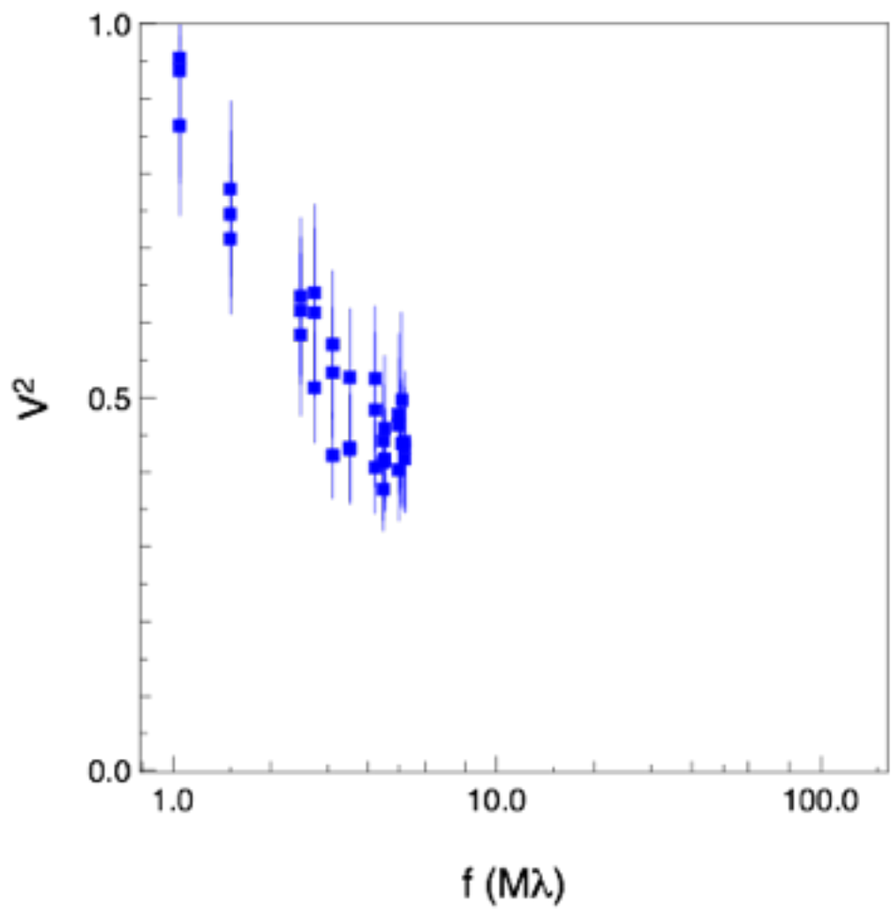

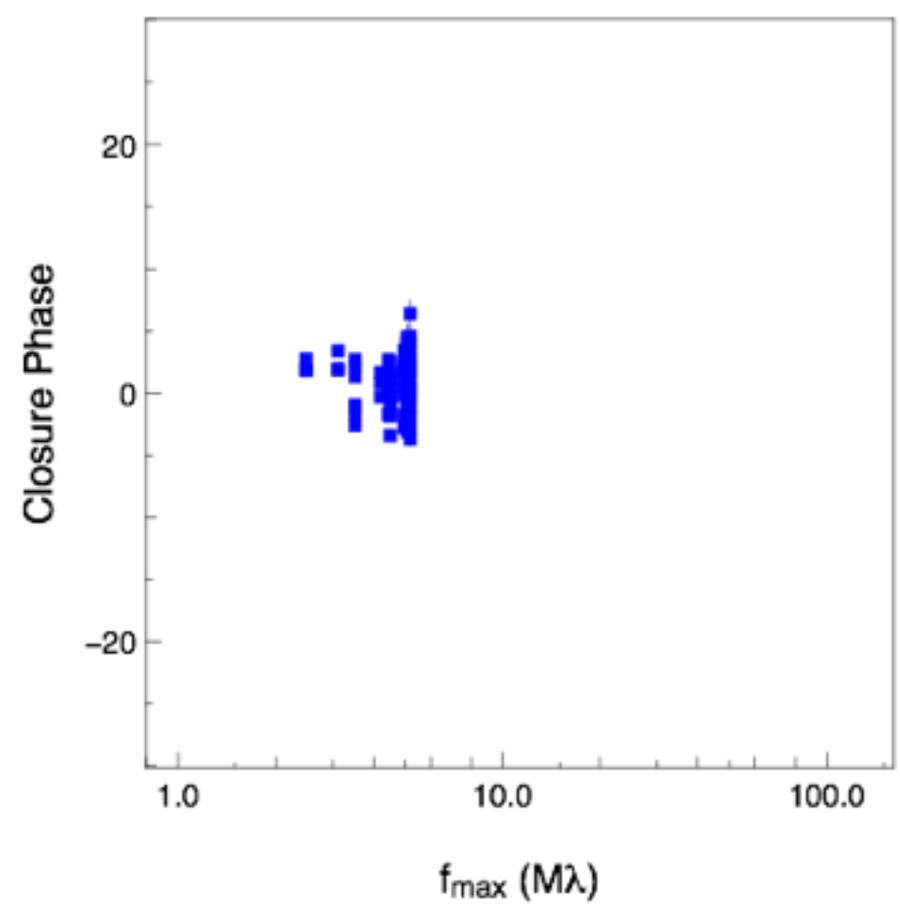

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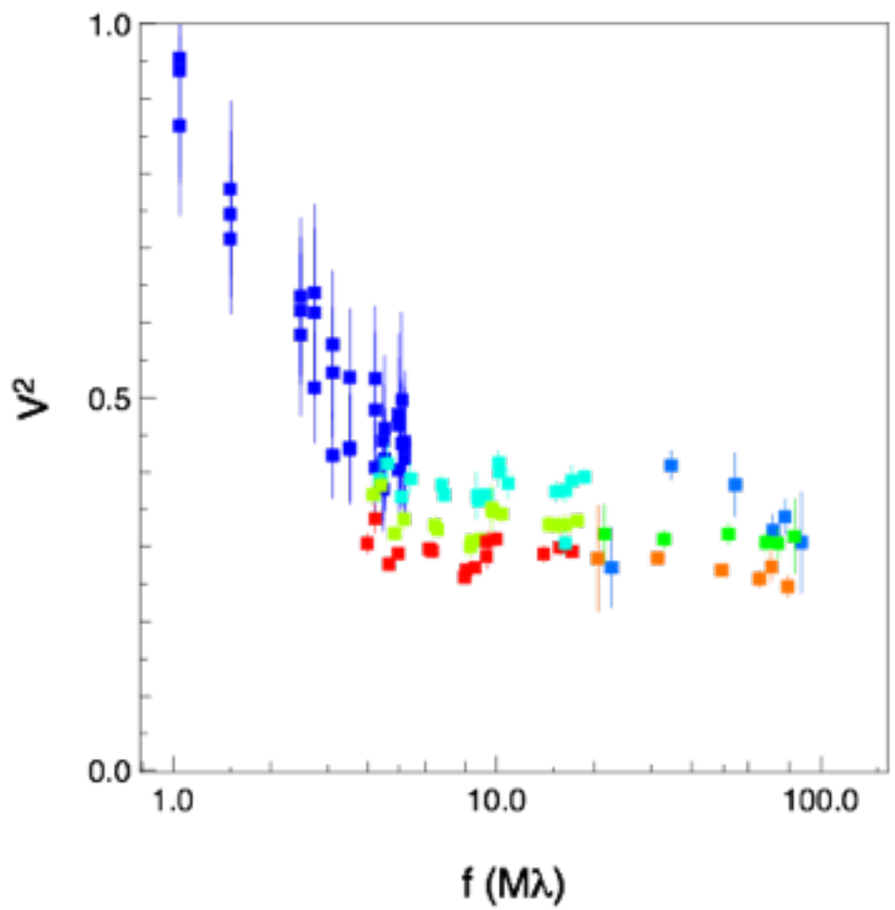
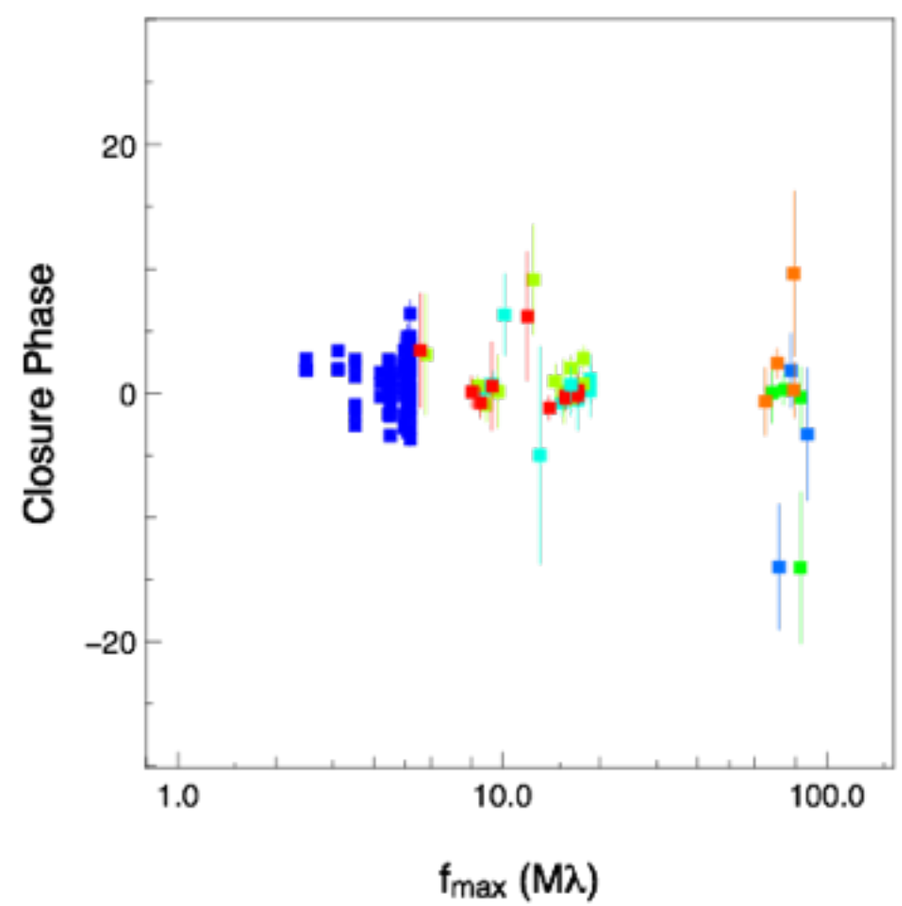
Near-infrared interferometry

KECK/NIRC2 **VLTI/PIONIER**





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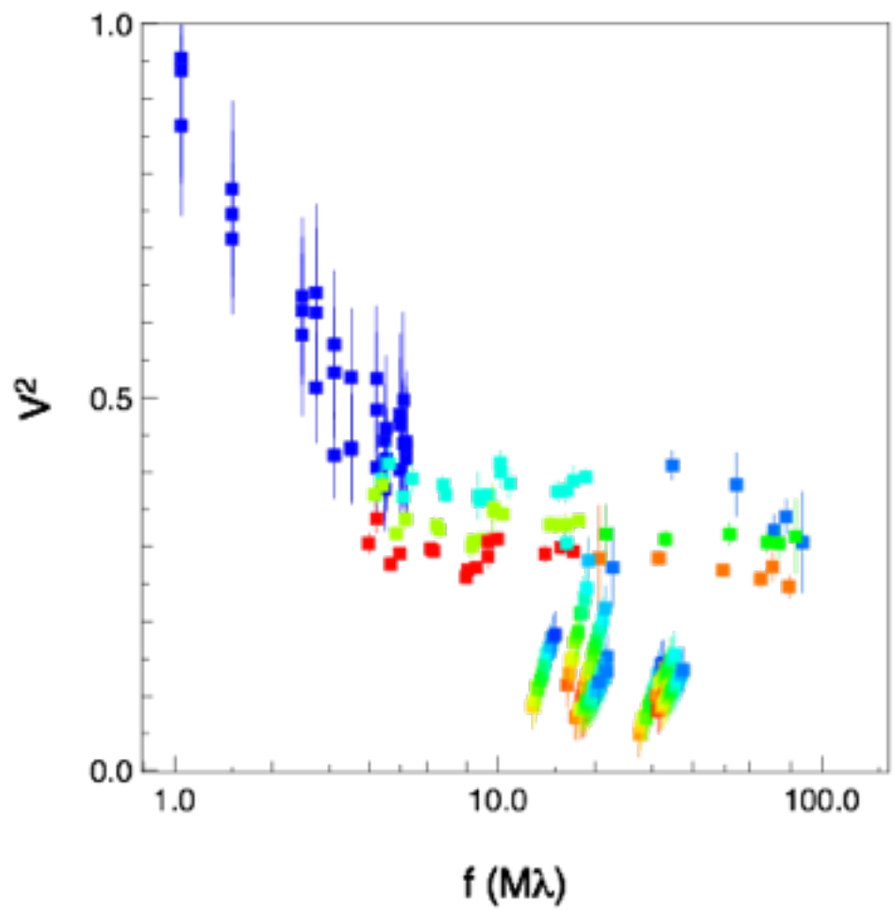
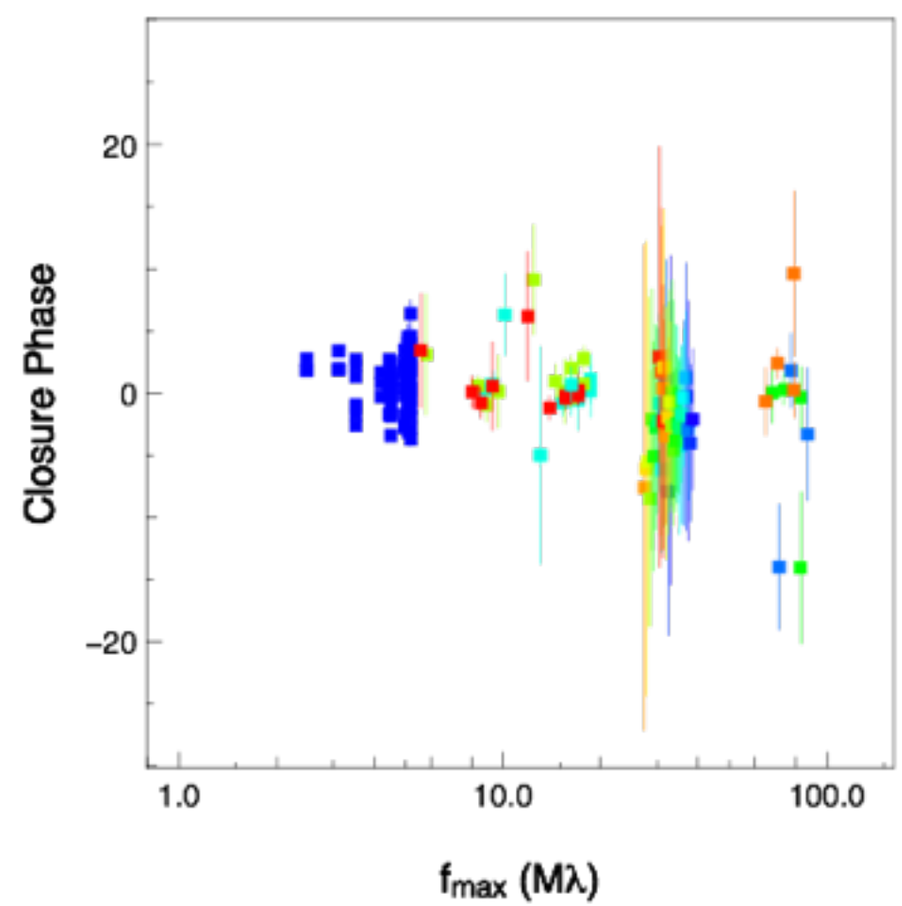
Near-infrared interferometry

KECK/NIRC2 VLTI/PIONIER&AMBER

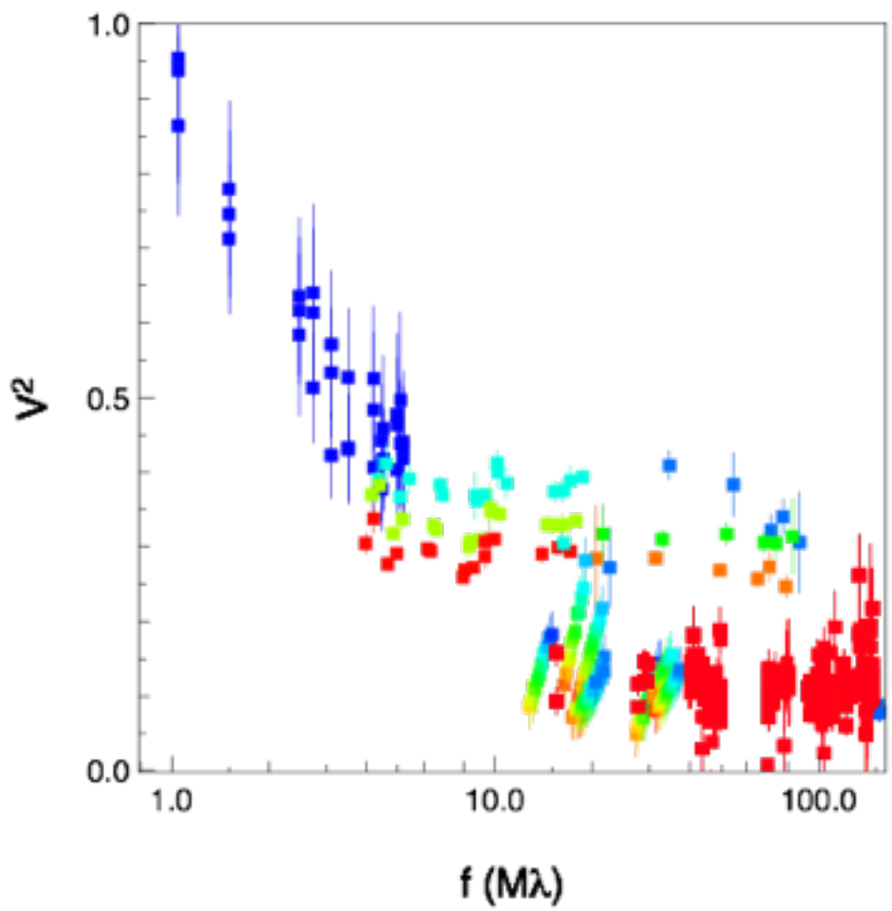


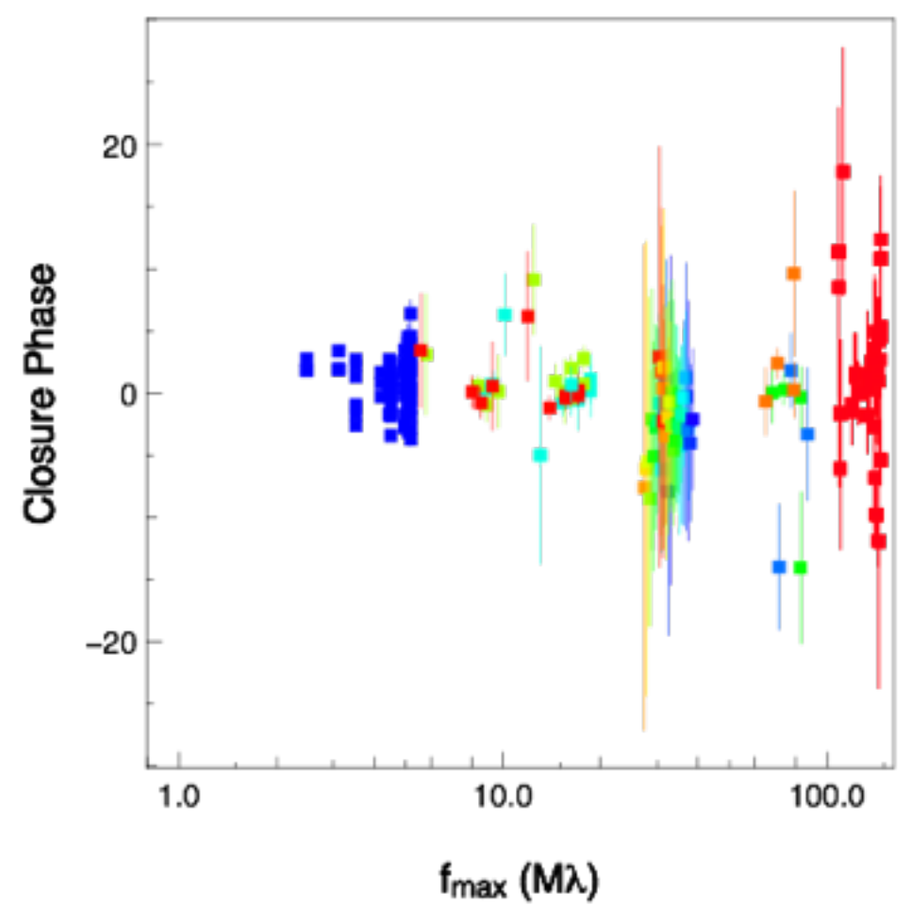


Kluska et al. 2018a

Near-infrared interferometry

KECK/NIRC2 VLTI/PIONIER&AMBER CHARA/CLIMB&CLASSIC





Kluska et al. 2018a

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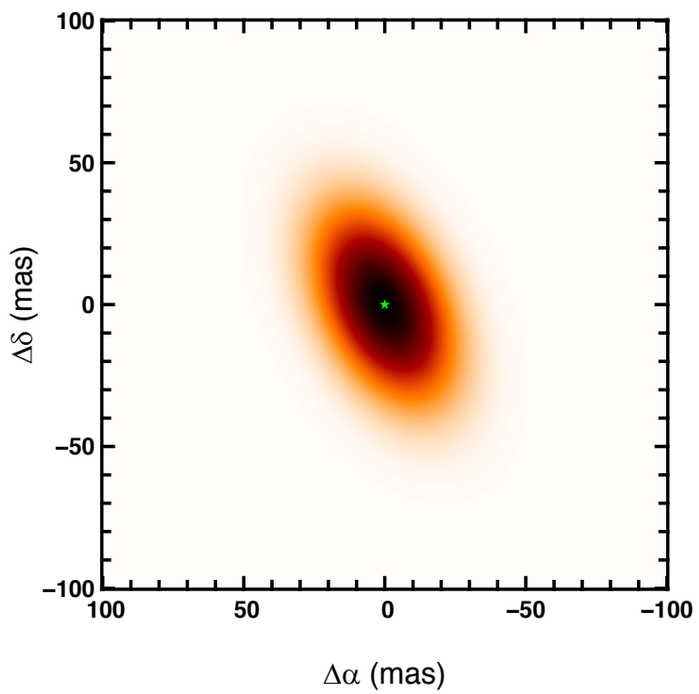
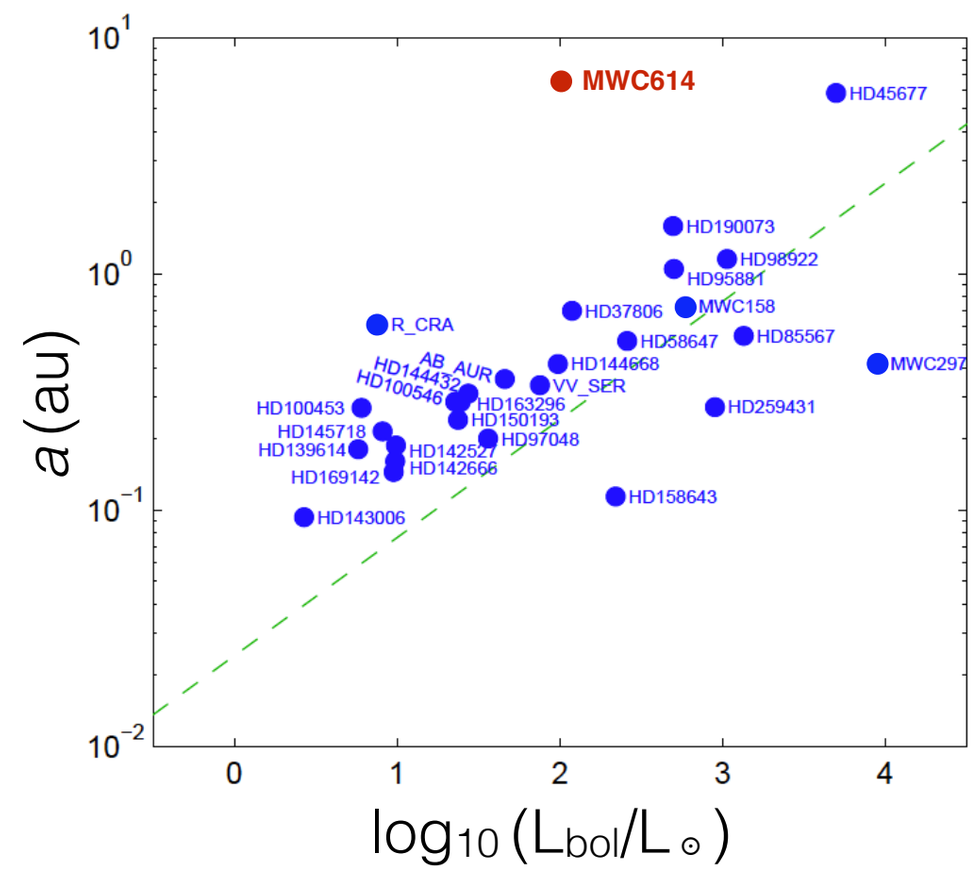


Long baseline interferometric data - Fit results - chi2=6.1

FWHM=51.0±2.4mas - ~10au !

i=54.8°±3.0°; PA=25.5°±2.6°

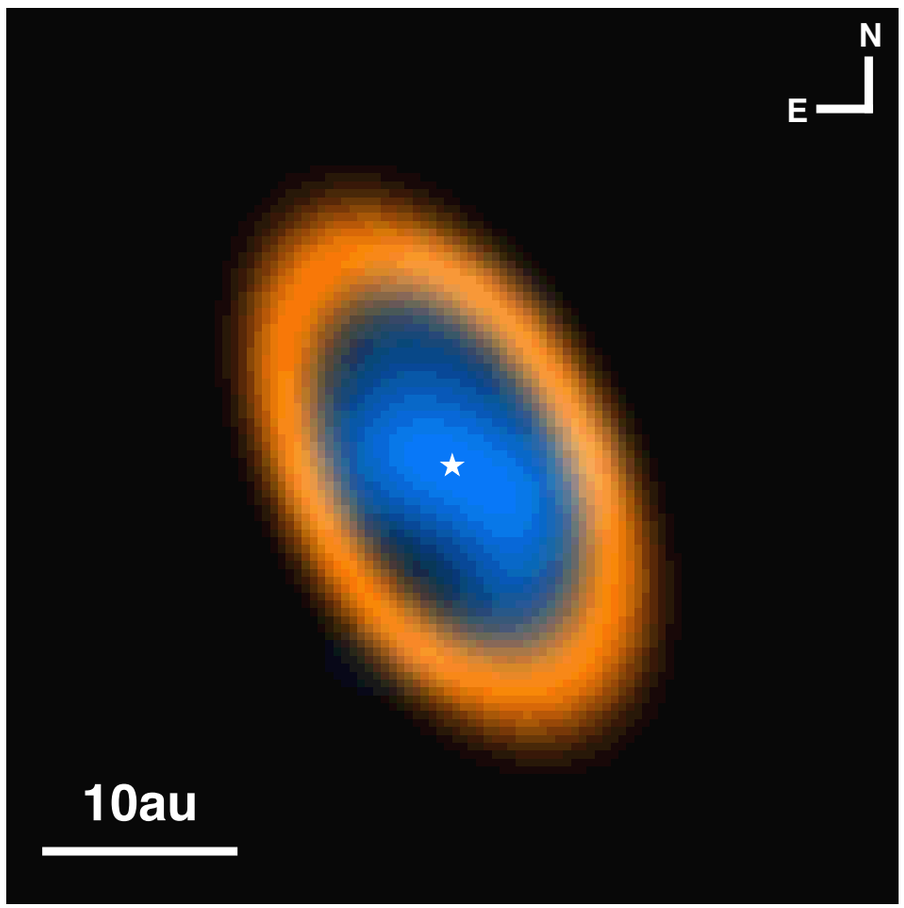
T_{env}=1435±28K

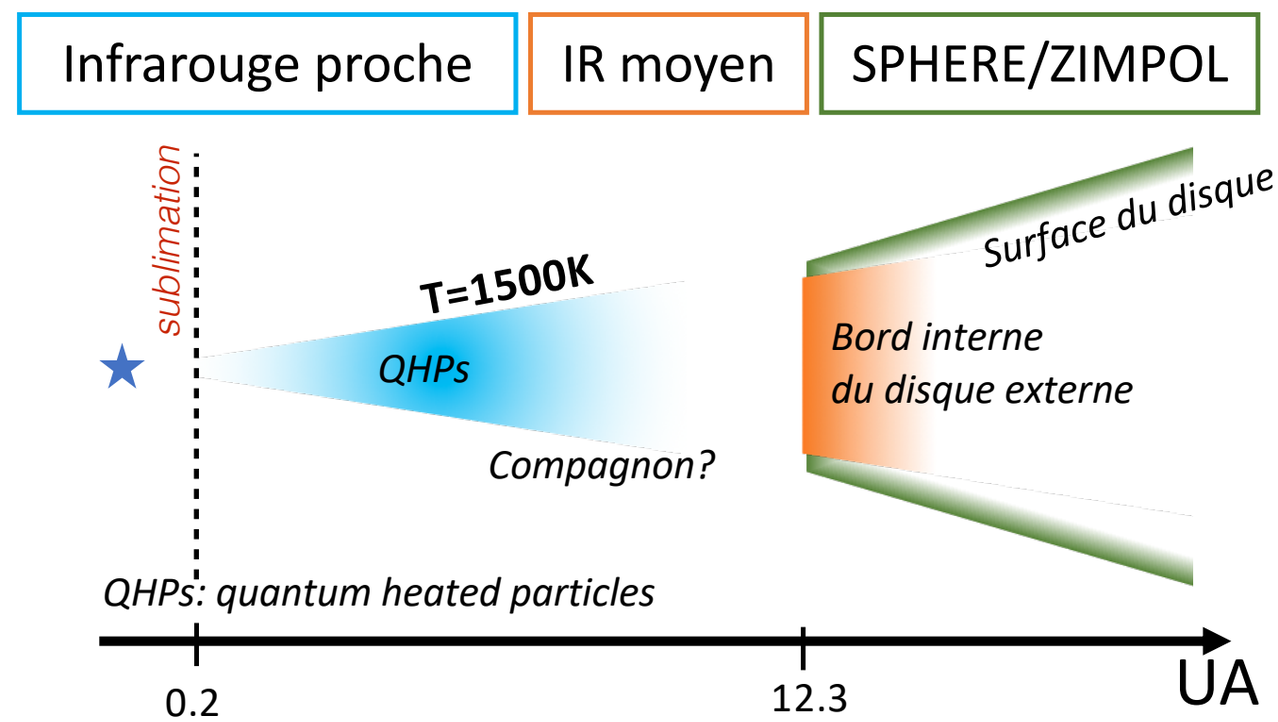


Lazareff et al. 2017, Kluska et al. 2019a, soumis

Kluska et al. 2018a

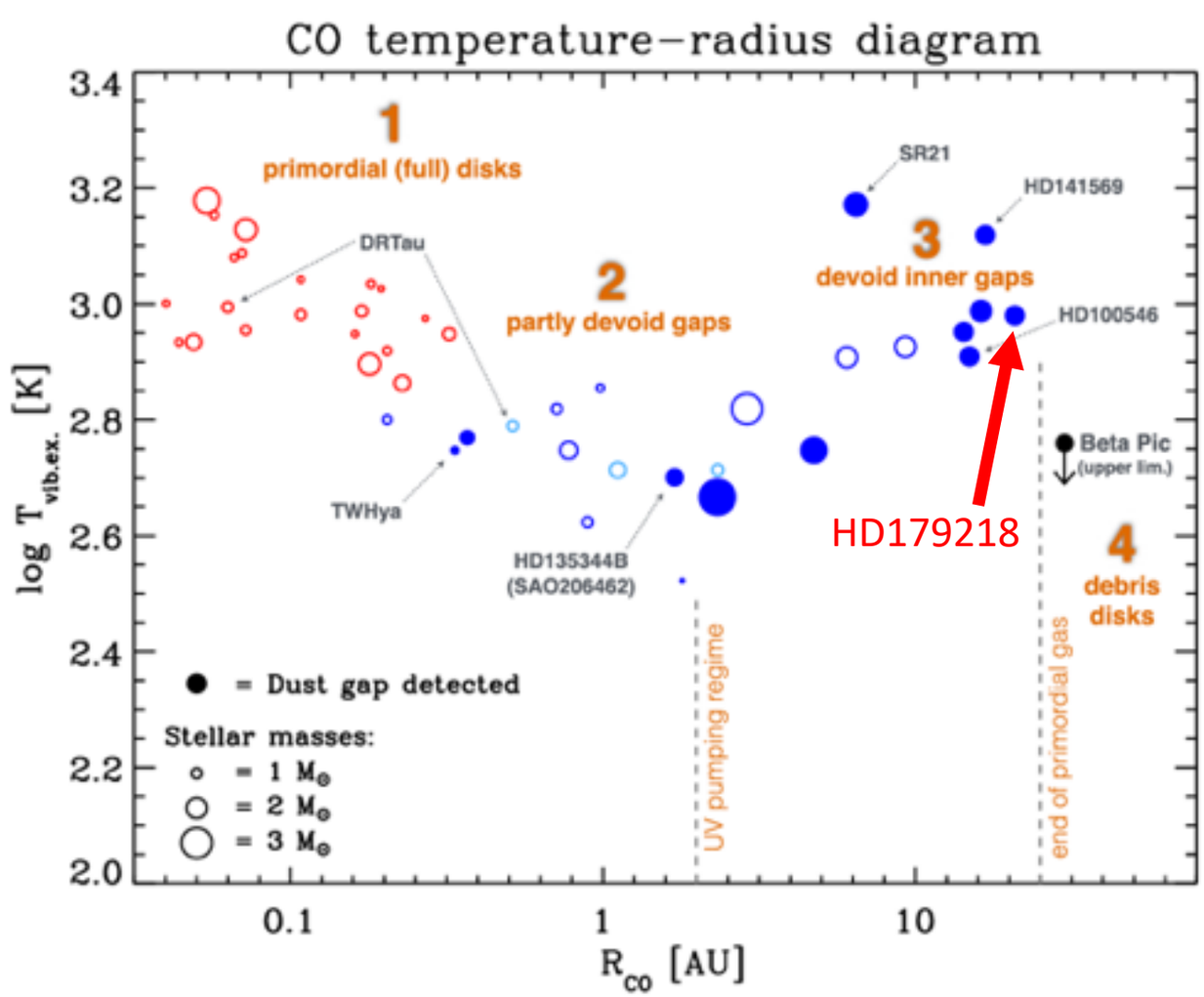
Disk structure

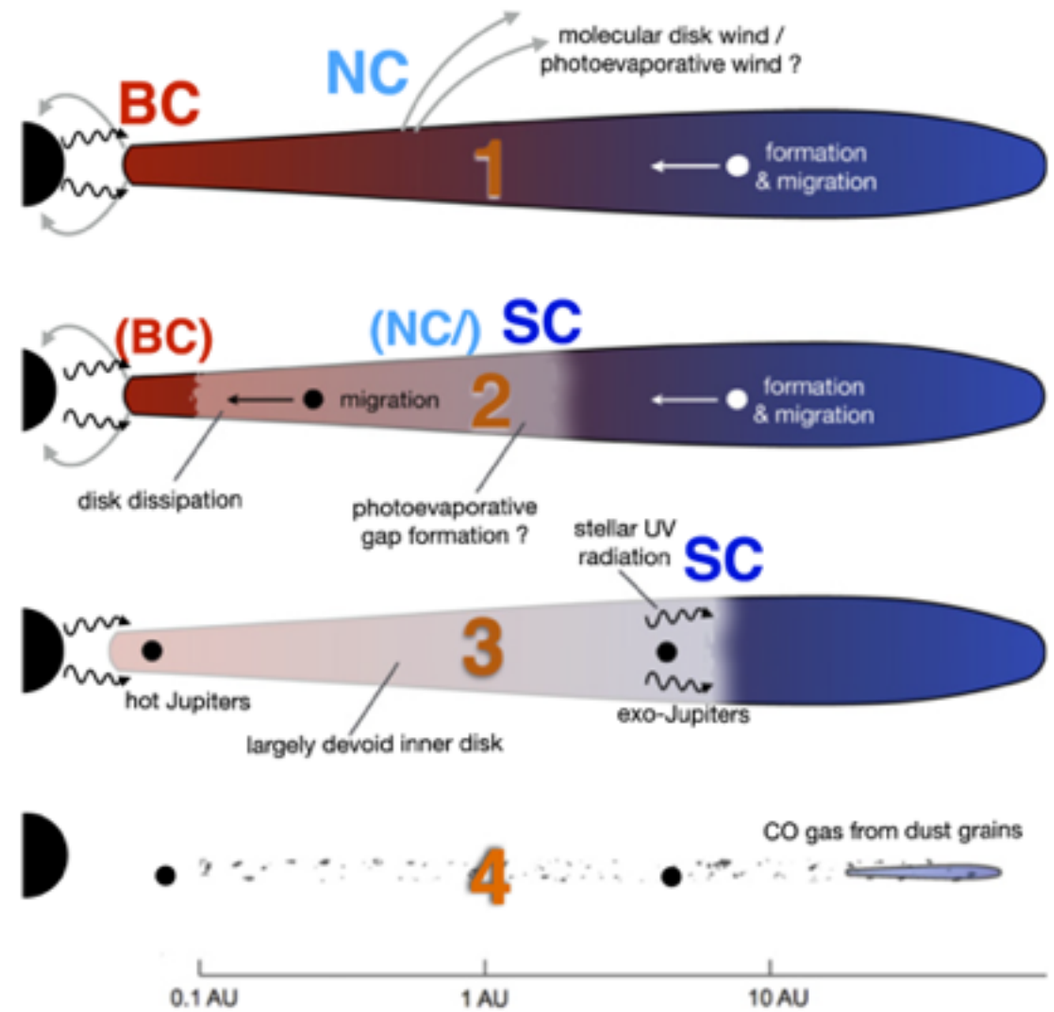




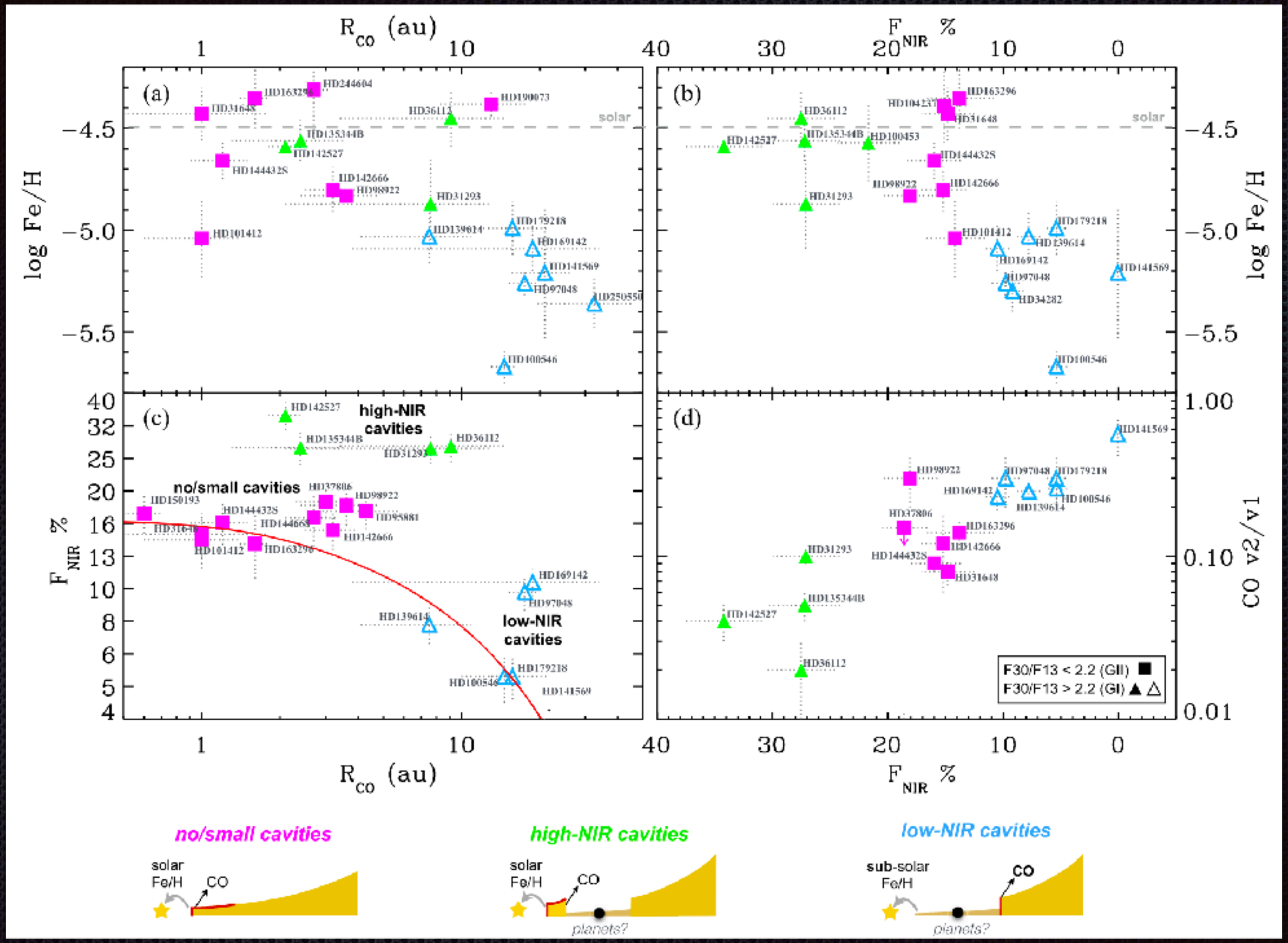
Kluska et al. 2018a

Disk evolutionary state

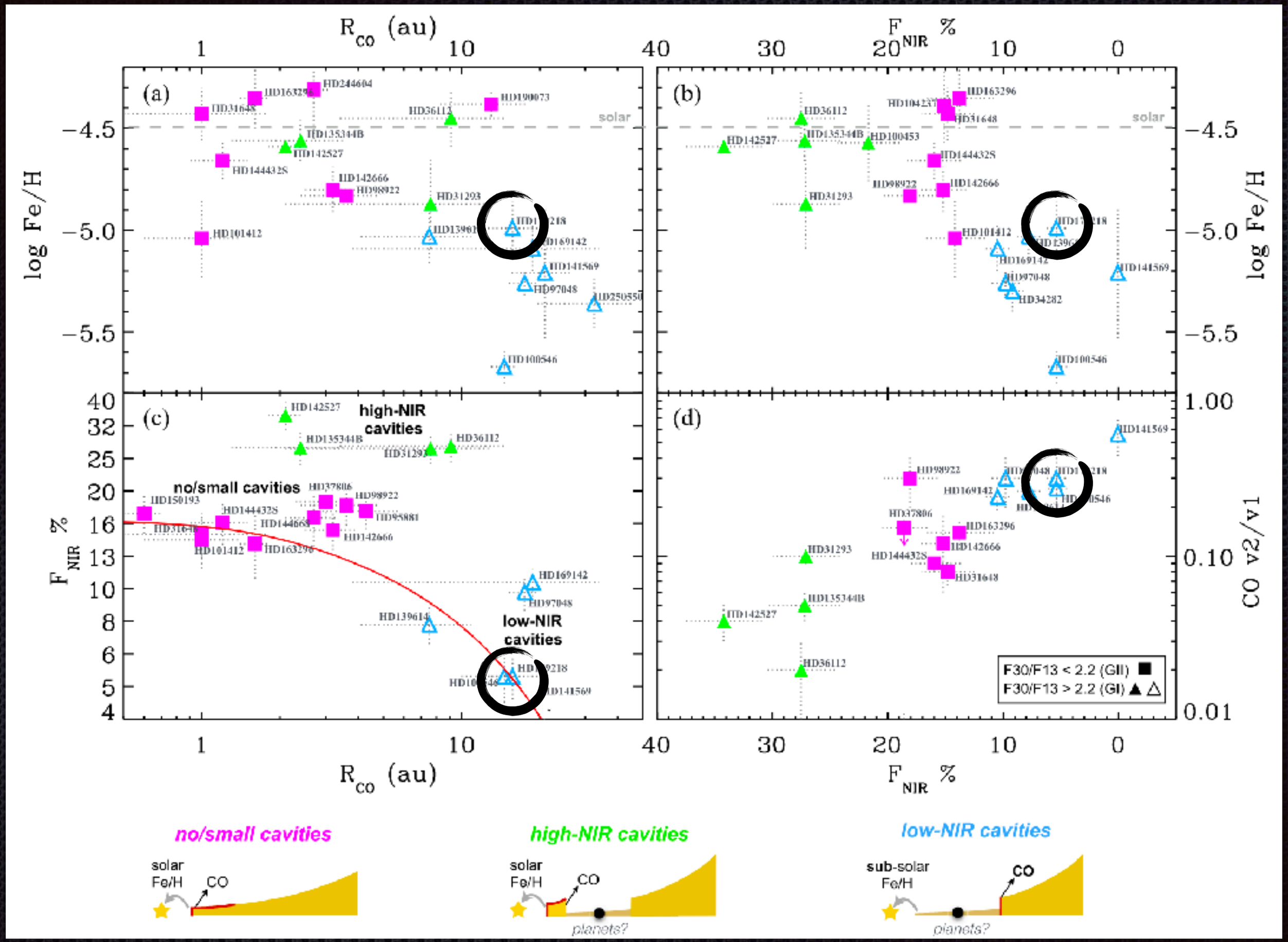




Banzatti & Pontoppidan 2015
Kluska et al. 2018a



Banzatti et al. 2018



Banzatti et al. 2018

Conclusions

- MWC614 has an **extended NIR emission at T_{sub} but not at R_{sub}**
- **A pre-transitional disk in a peculiar stage:** dispersion of its inner disk? Dust filtering via a companion ? (upper limit: 0.34 Msun

- Looking for companion
- Follow-up on the complex disk structures
- Radiative transfer model reproducing this rich dataset

➡ Multi-instrument, multi-wavelength approach perfect to study disk structure in the inner disk

➡ VLTI/MATISSE + GRAVITY / CHARA / SPHERE / ALMA