

# Beobachtungen protostellarer Scheiben mit Optischer Interferometrie

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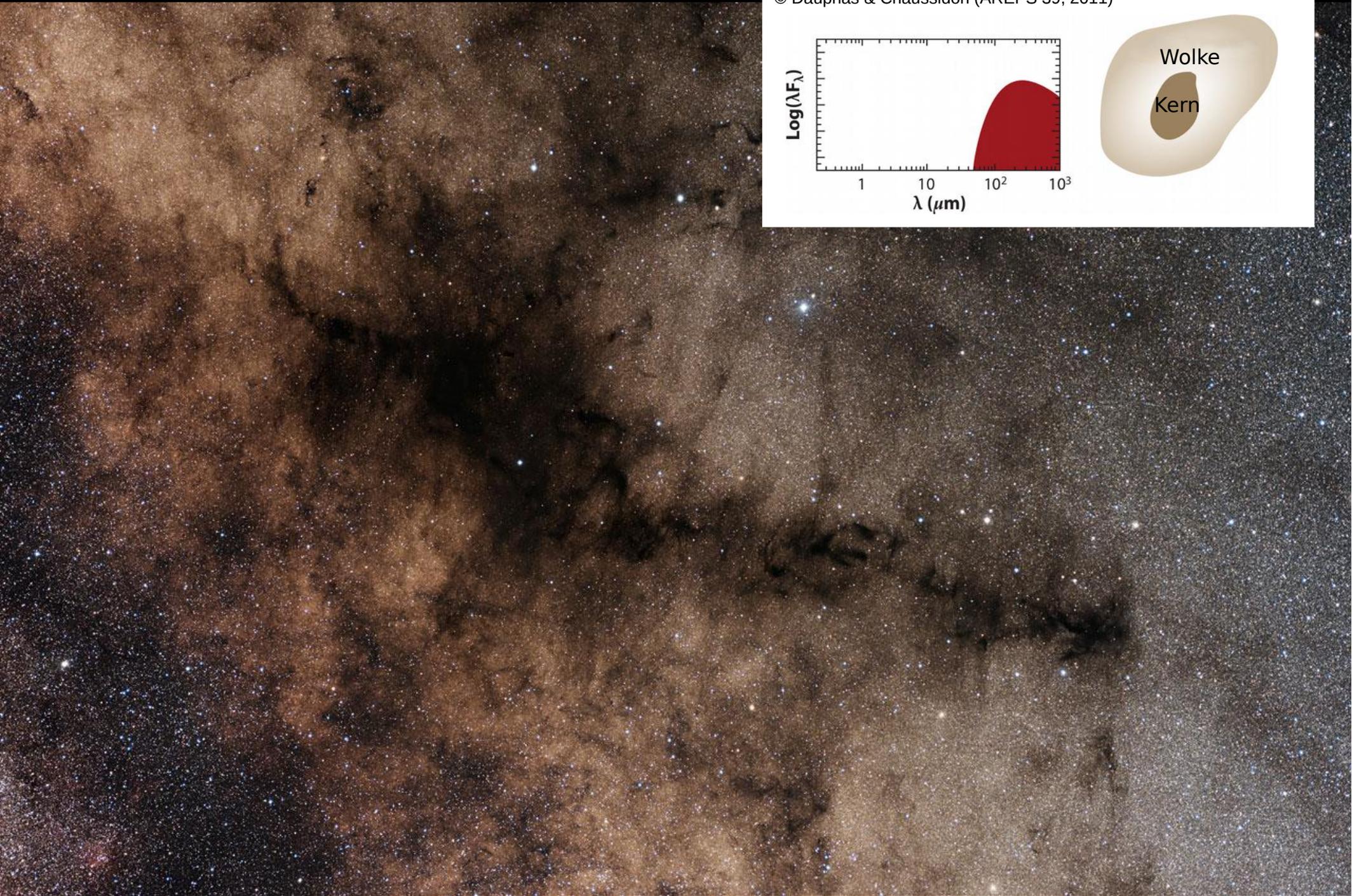
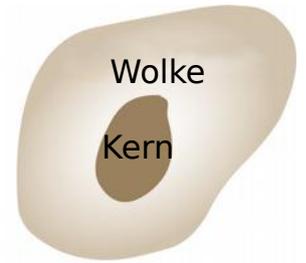
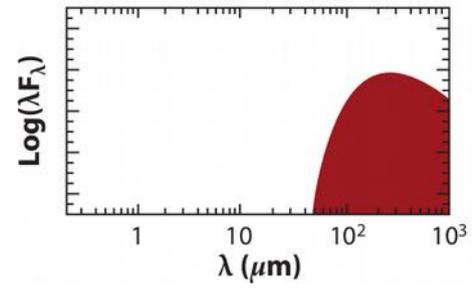
Einleitung

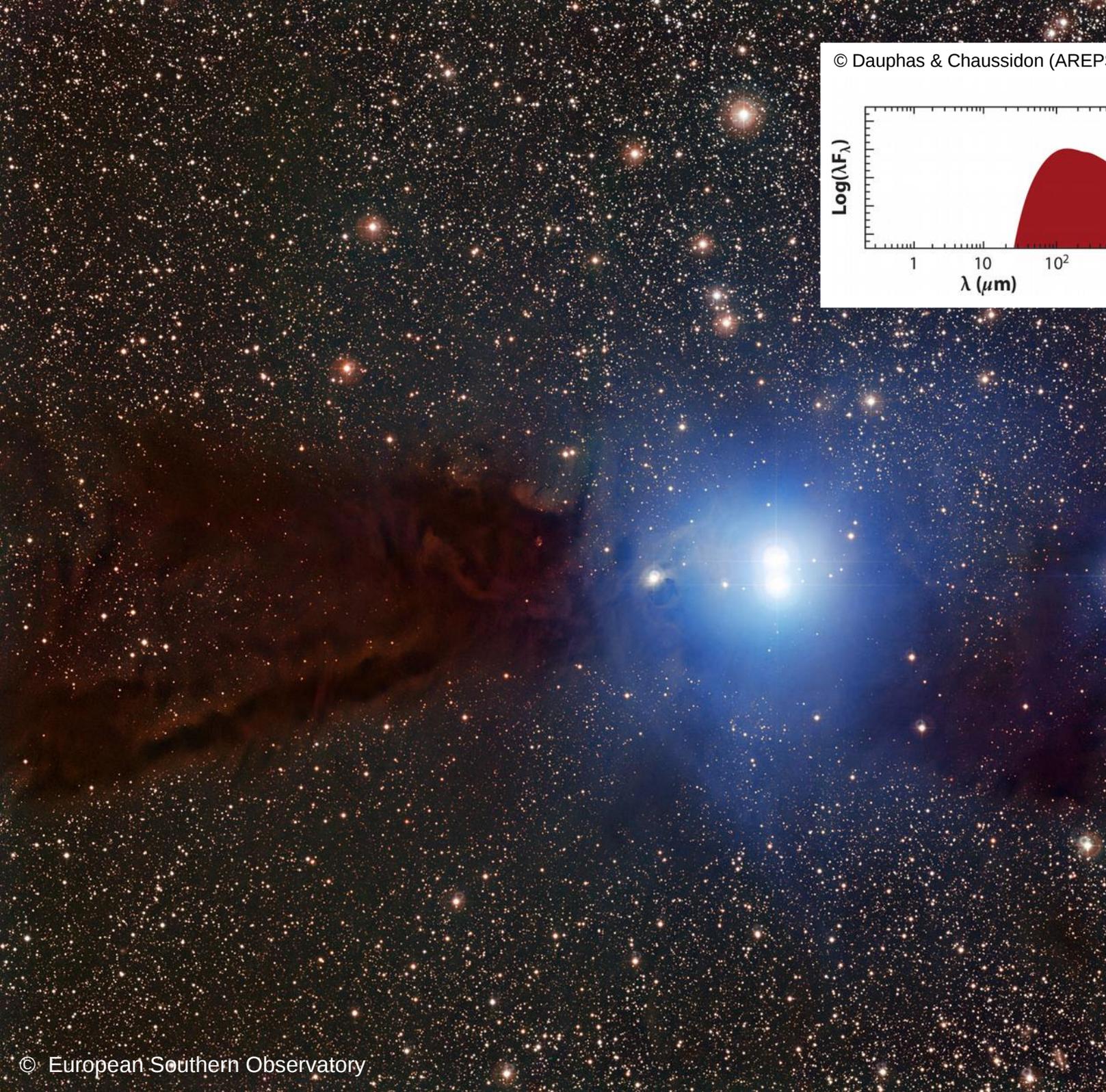
# Was sind Protostellare Scheiben?



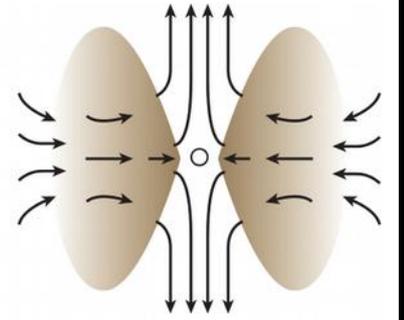
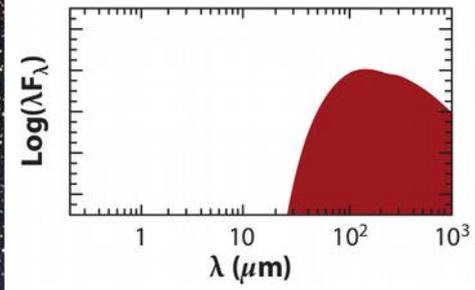
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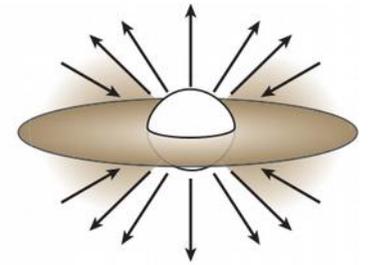
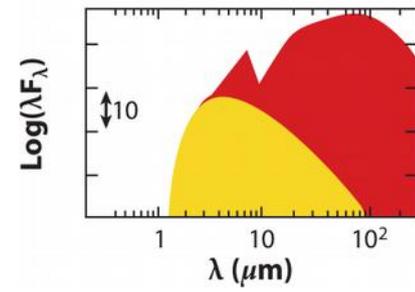


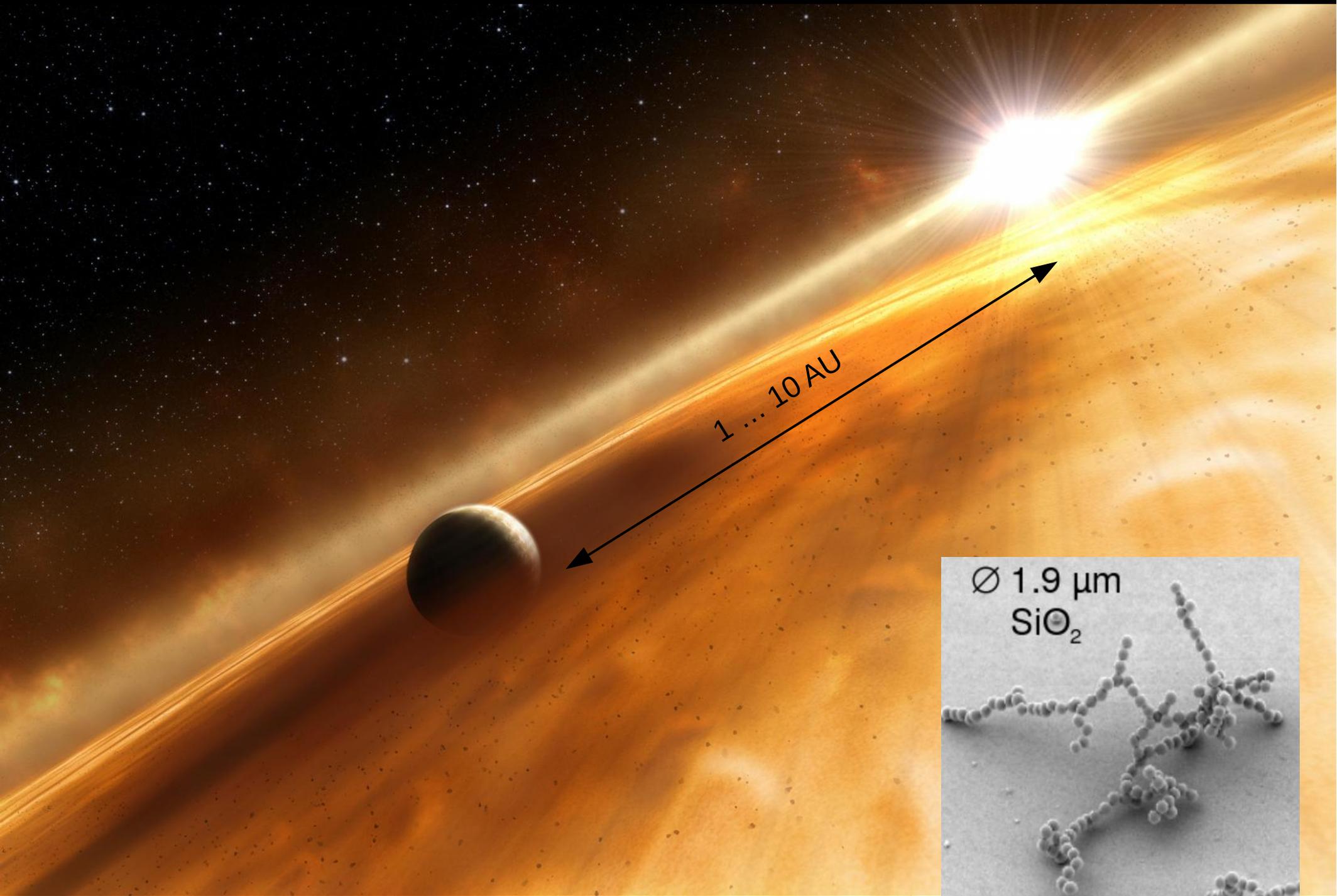


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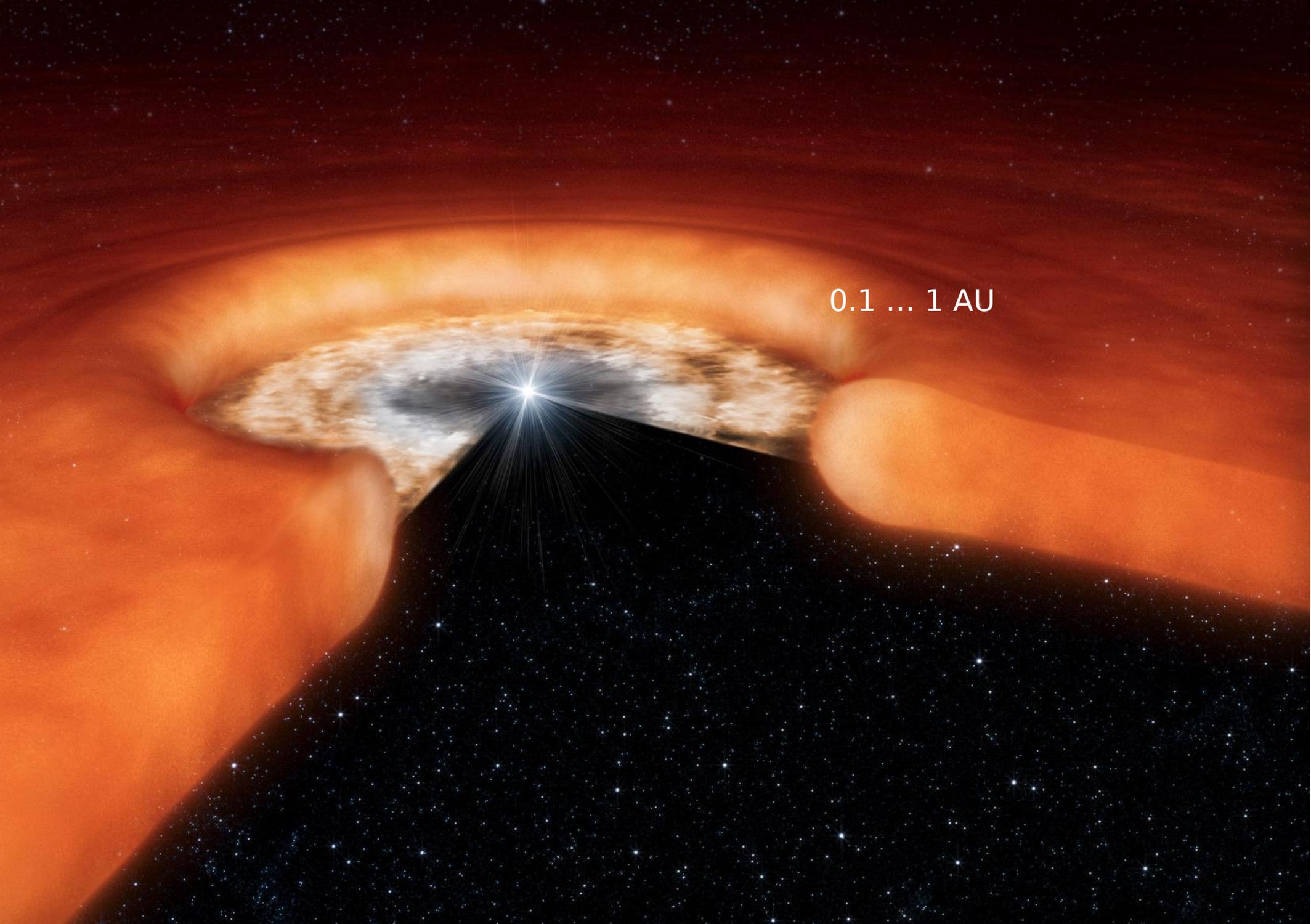




1 ... 10 AU



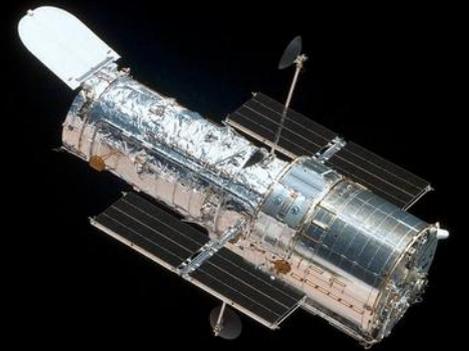
© Alexander Seizinger

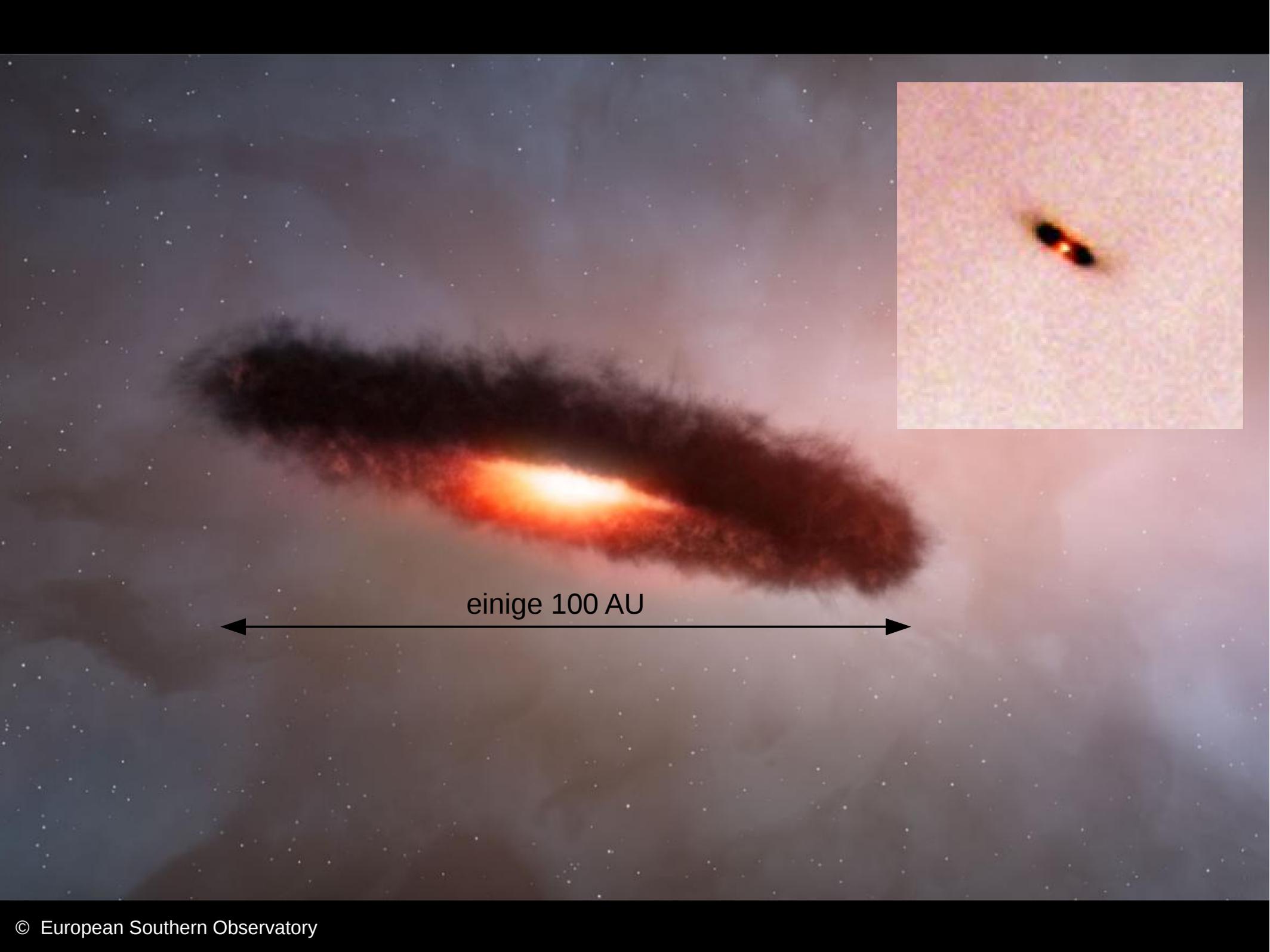


0.1 ... 1 AU

Beobachtungen

# Wie lassen sich Scheiben untersuchen?

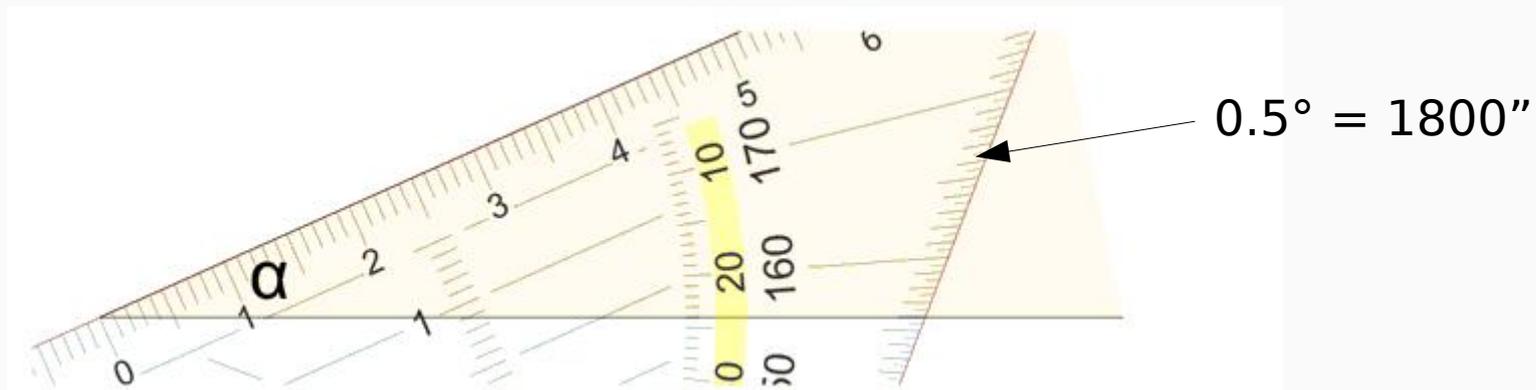




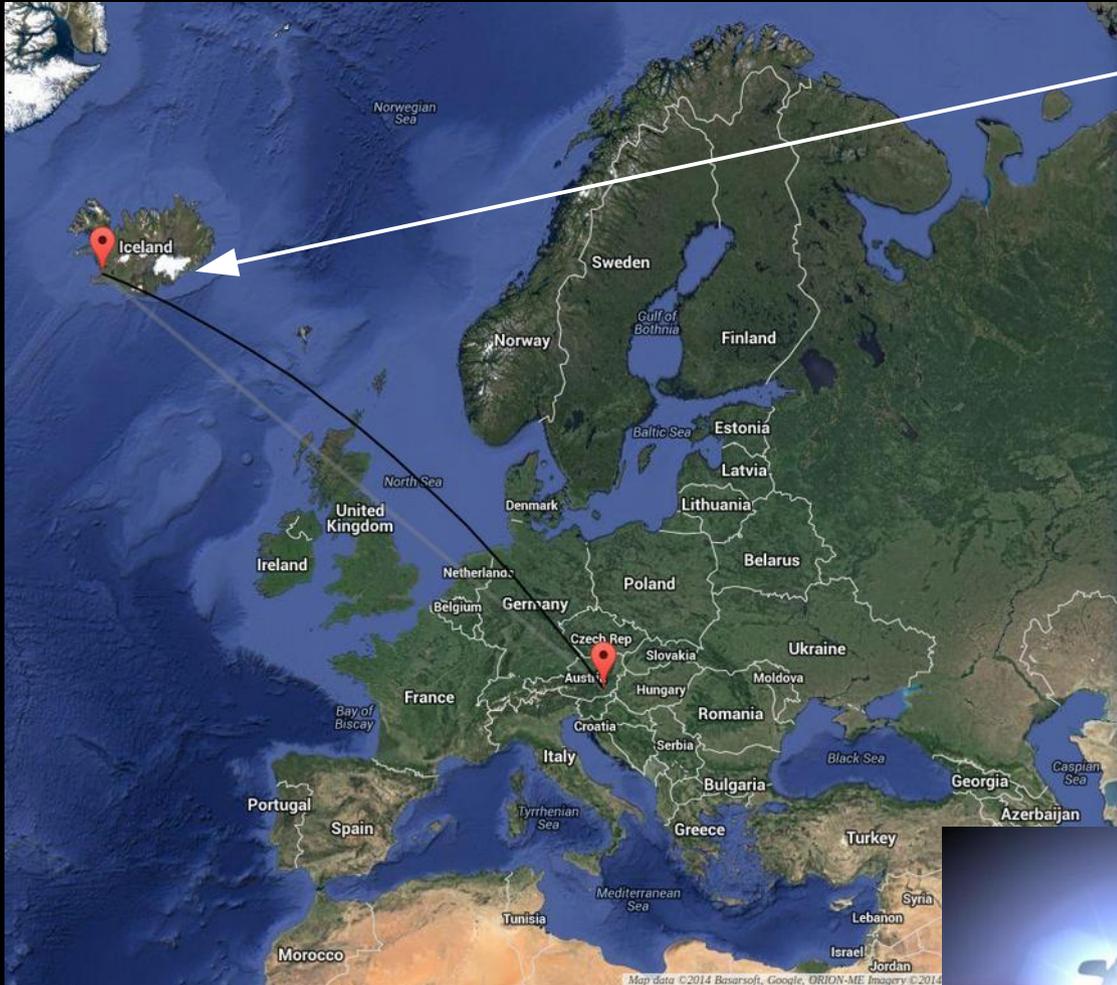
einige 100 AU

# Wie groß erscheint uns eine Scheibe?

äußerer Bereich:	$2 \times 100.0 \text{ AU} \rightarrow 2.0''$	(in 100 pc Entfernung)
fernes Infrarot:	$2 \times 10.0 \text{ AU} \rightarrow 0.2''$	
mittleres Infrarot:	$2 \times 1.0 \text{ AU} \rightarrow 0.02''$	
nahes Infrarot:	$2 \times 0.1 \text{ AU} \rightarrow 0.002''$	
Durchmesser Stern:	$0.01 \text{ AU} \rightarrow 0.0001''$	



# Wie groß erscheint uns eine Scheibe?



Da!?



Oje!

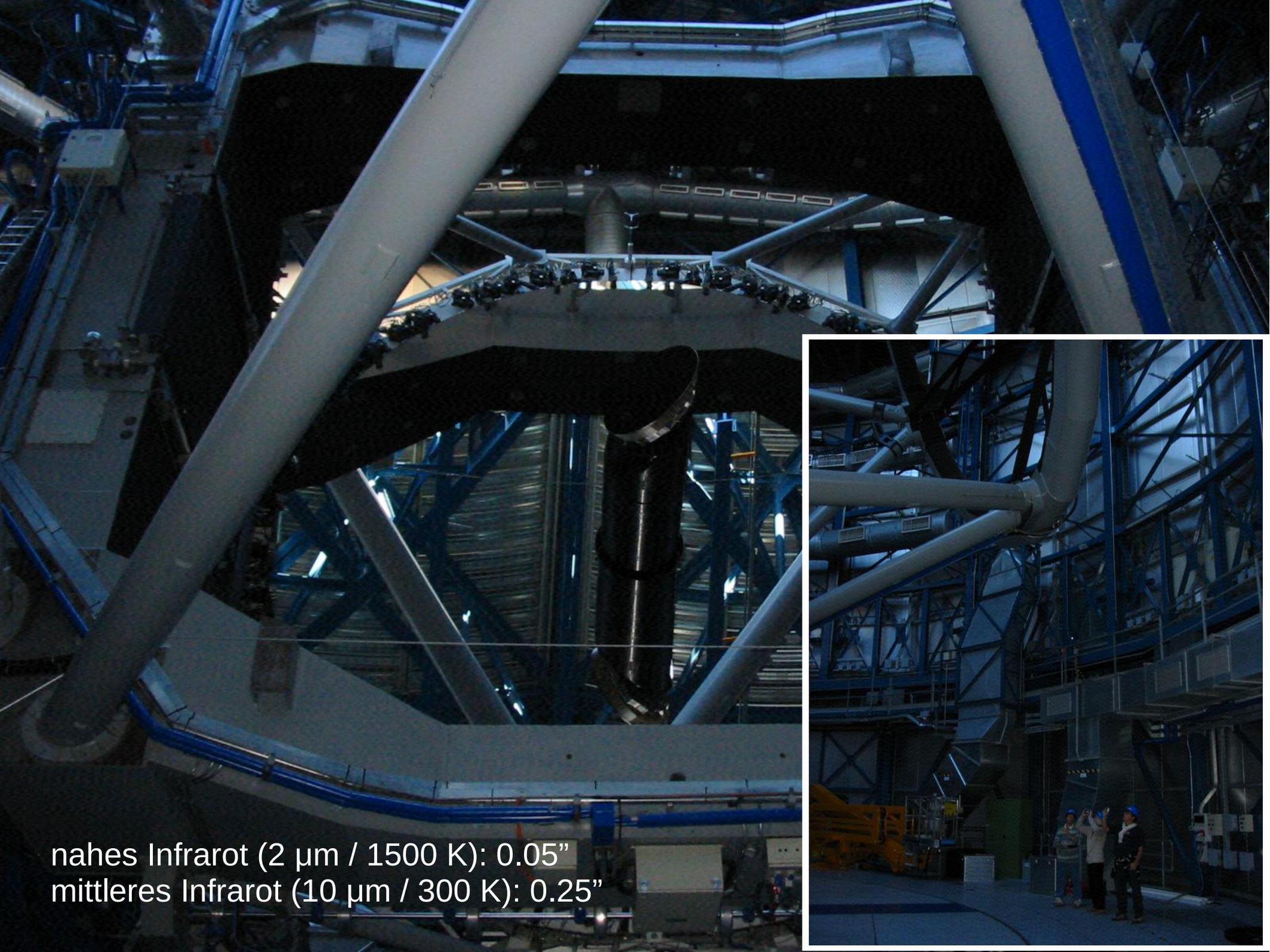
Das!?



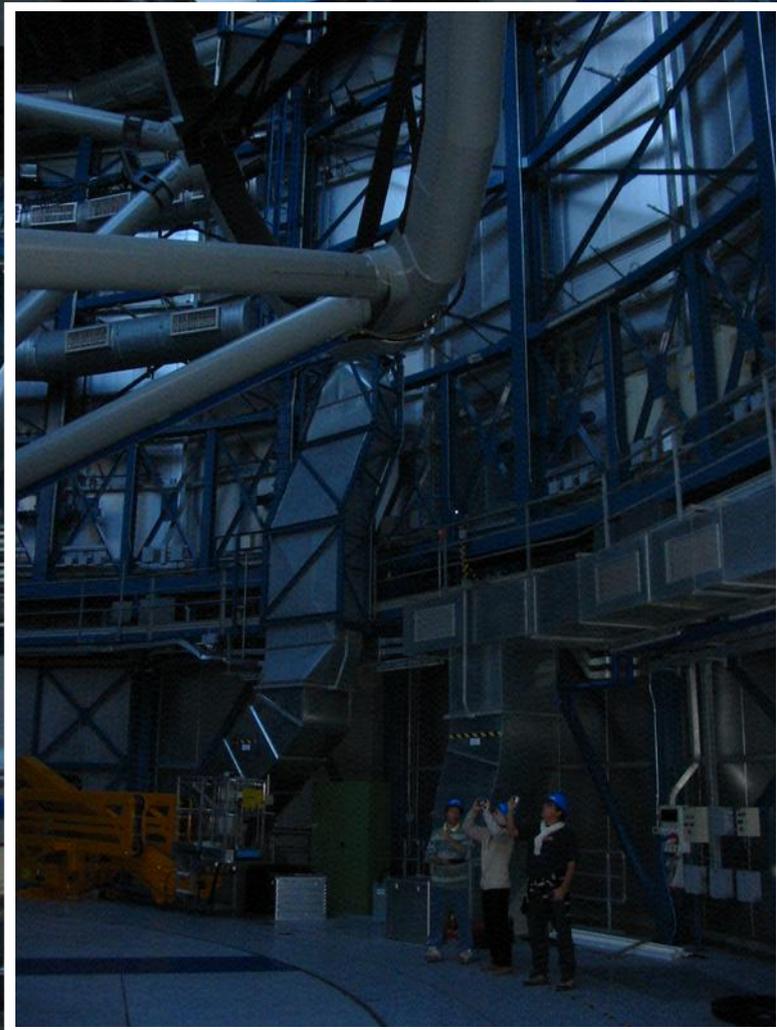




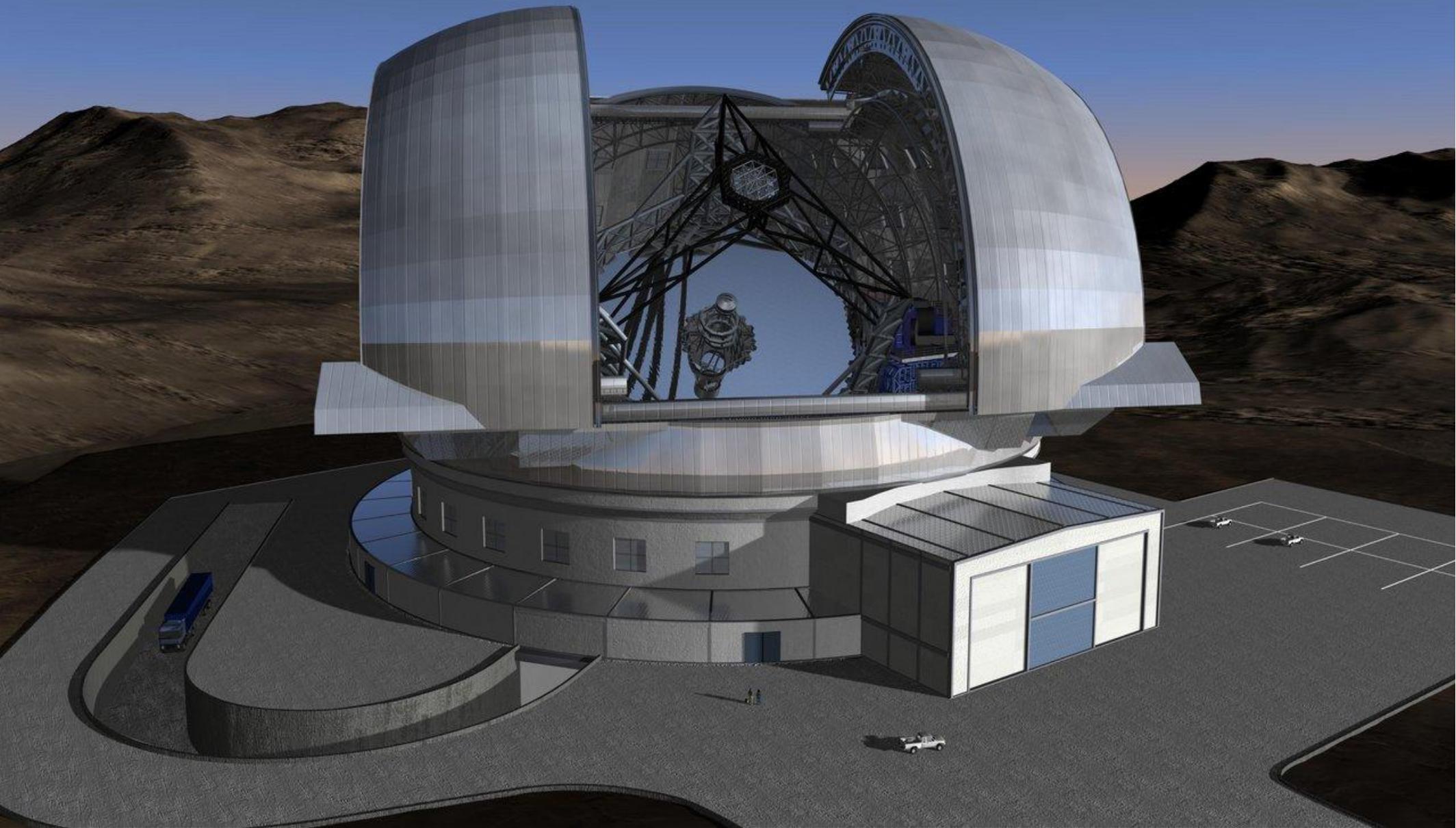


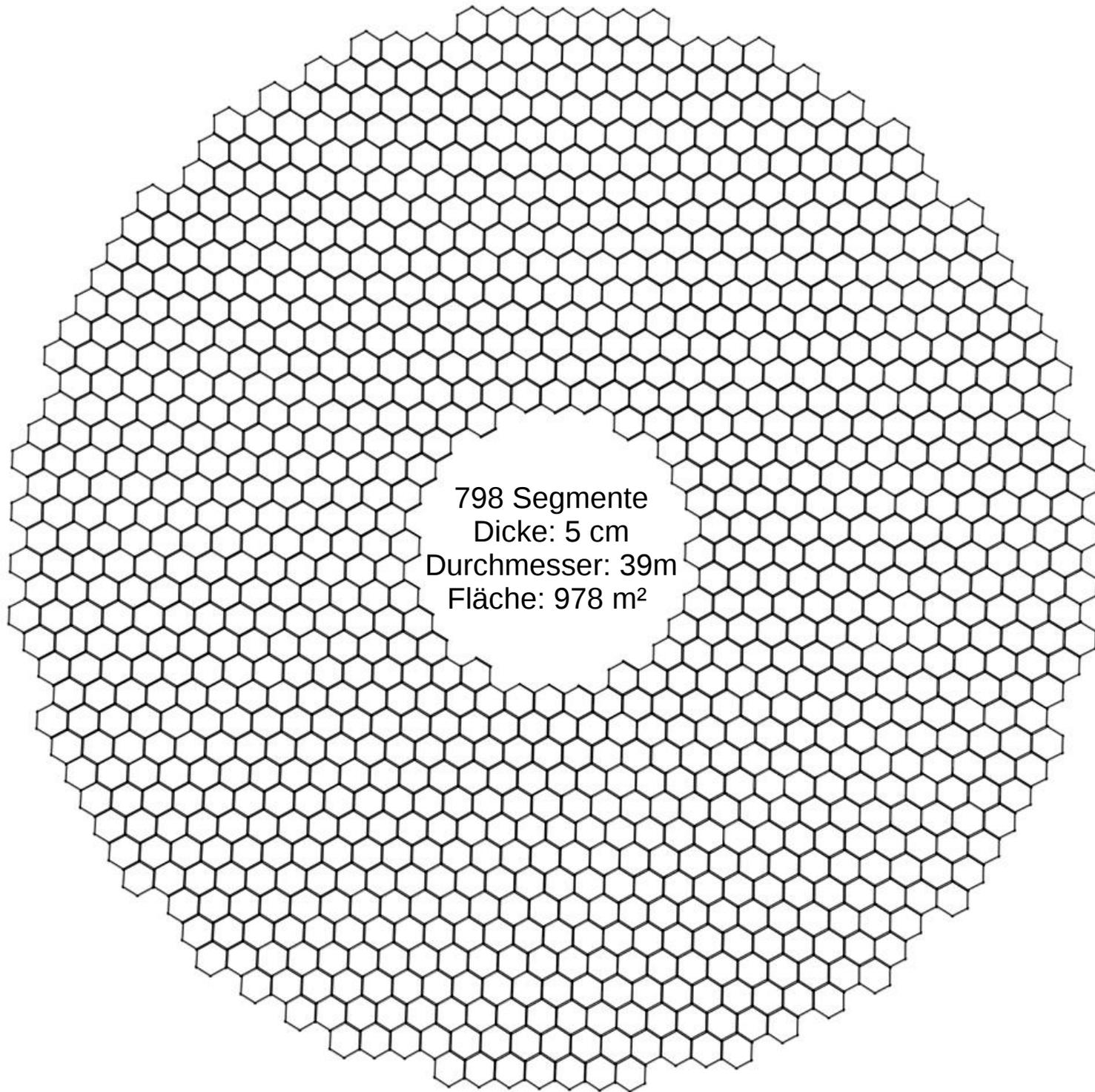


nahes Infrarot ( $2 \mu\text{m}$  / 1500 K): 0.05"  
mittleres Infrarot ( $10 \mu\text{m}$  / 300 K): 0.25"

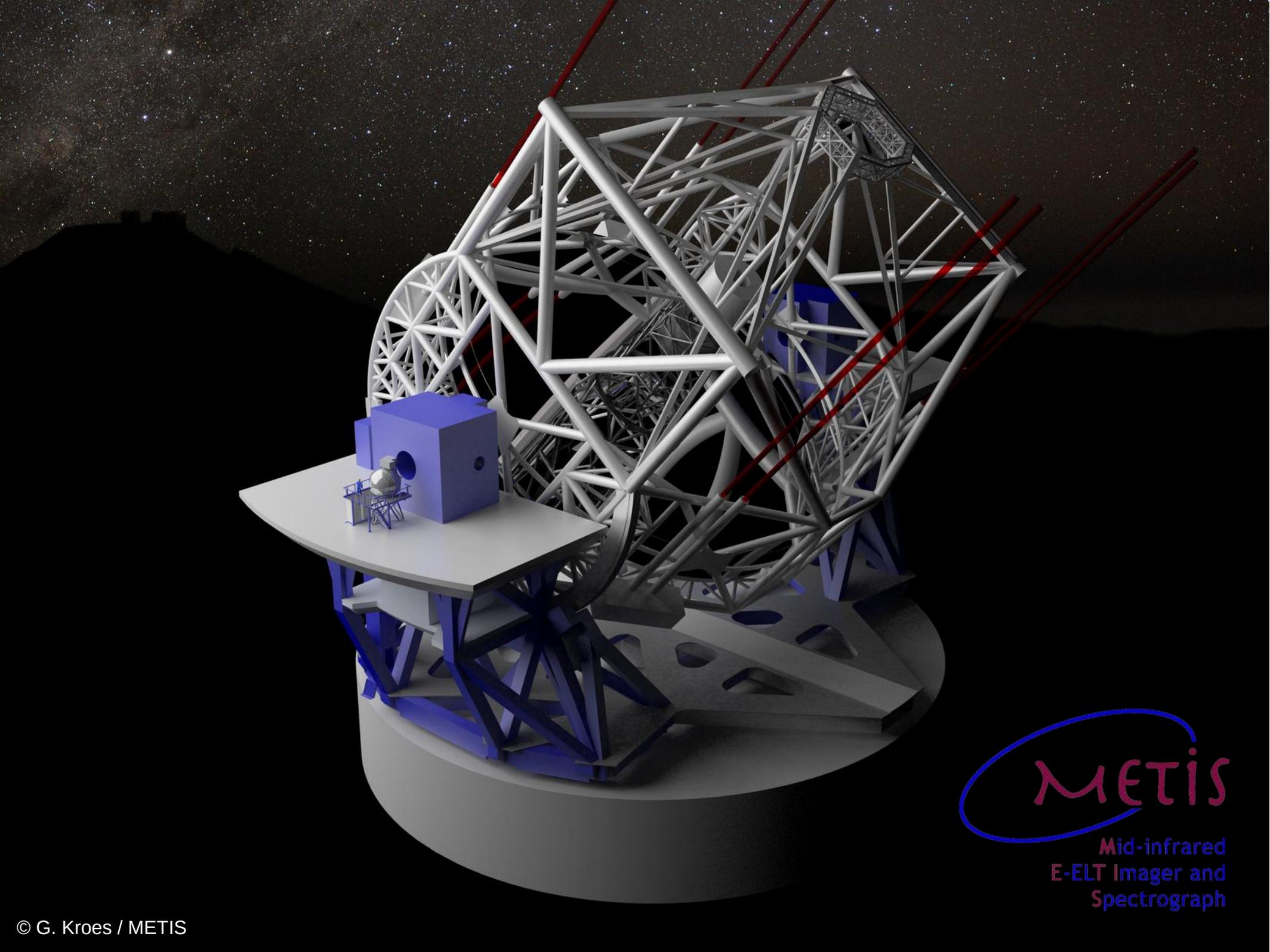


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mittleres Infrarot ( $10 \mu\text{m}$  / 300 K):  $0.05''$

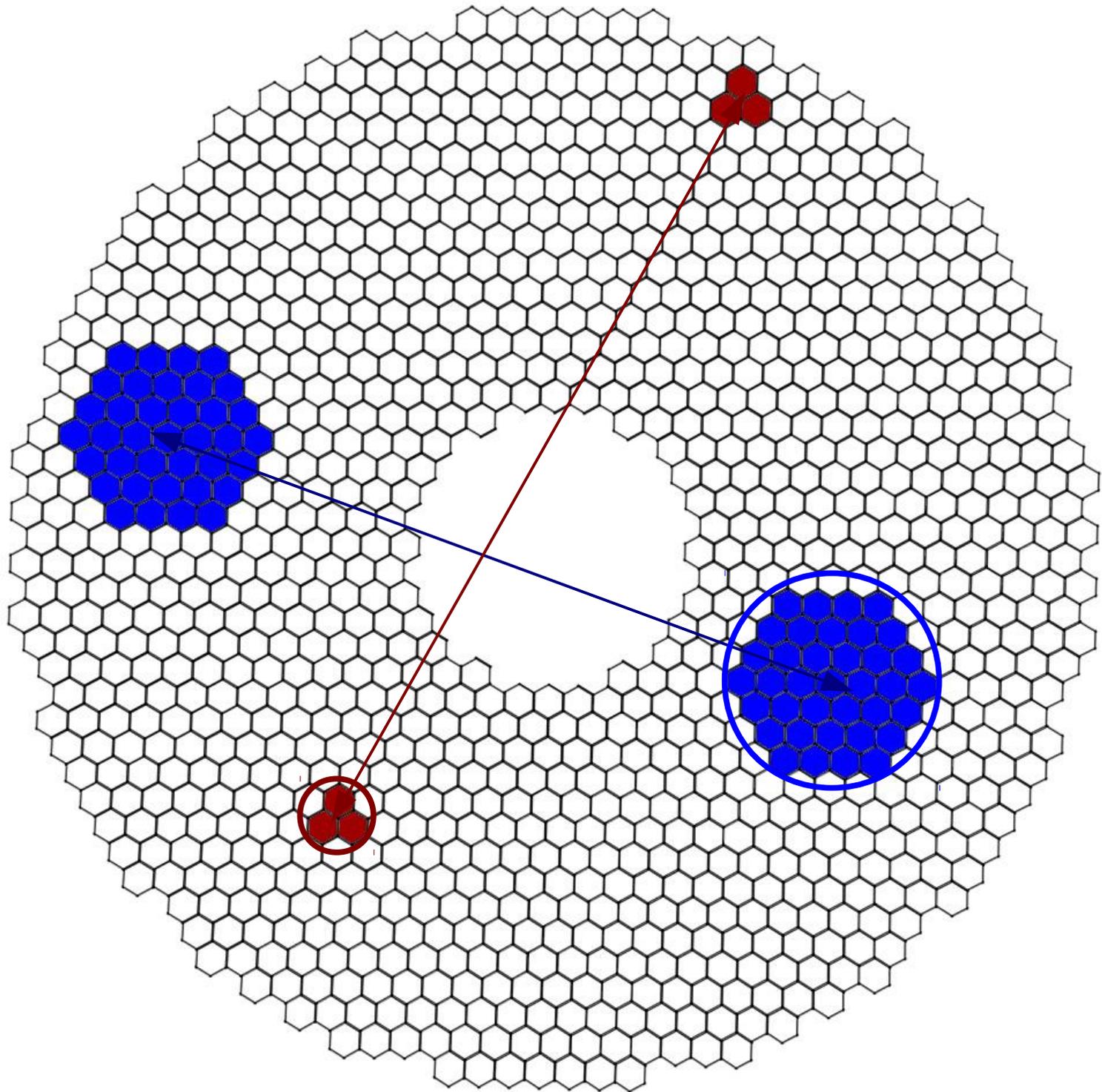




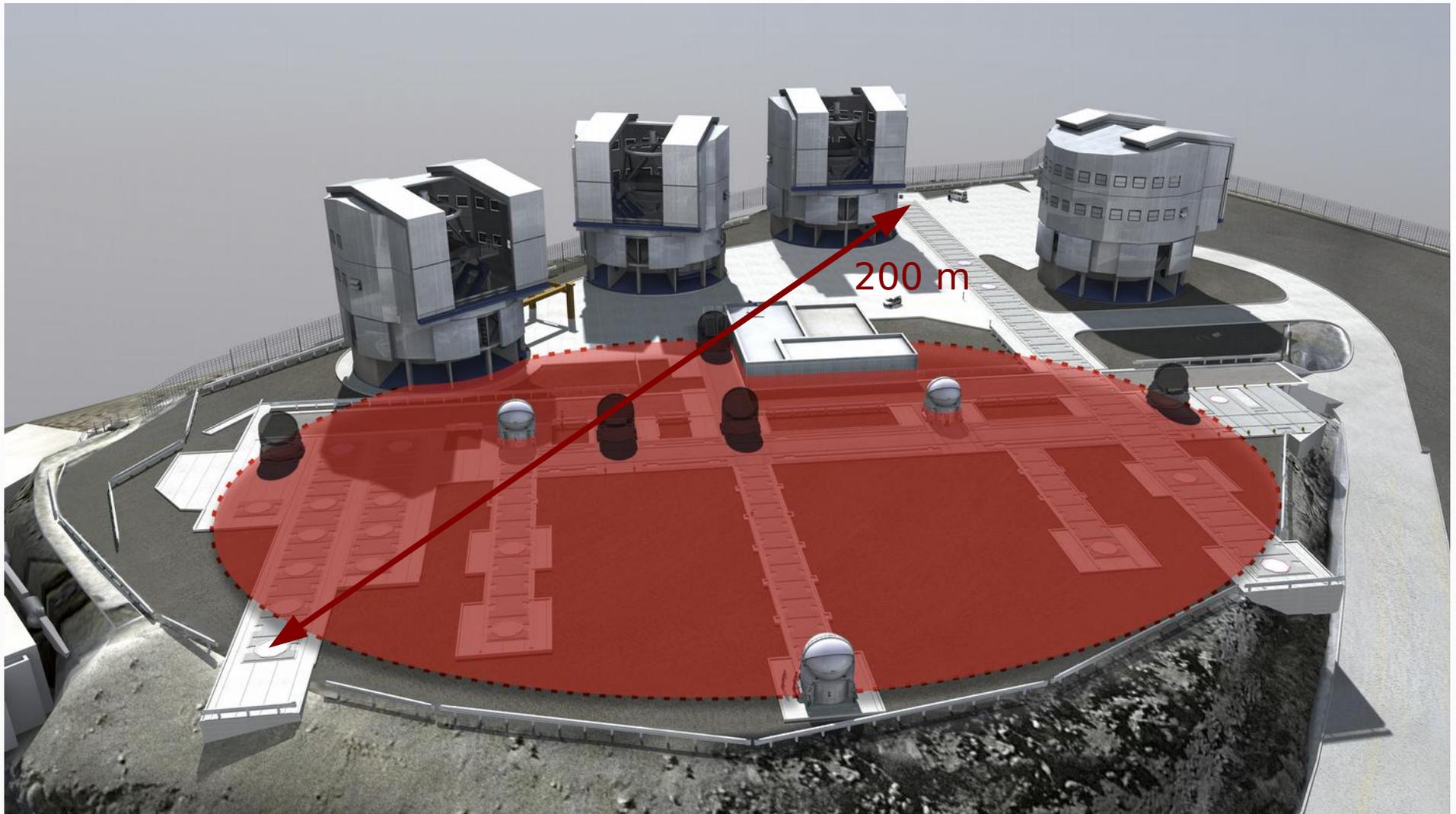
798 Segmente  
Dicke: 5 cm  
Durchmesser: 39m  
Fläche: 978 m<sup>2</sup>



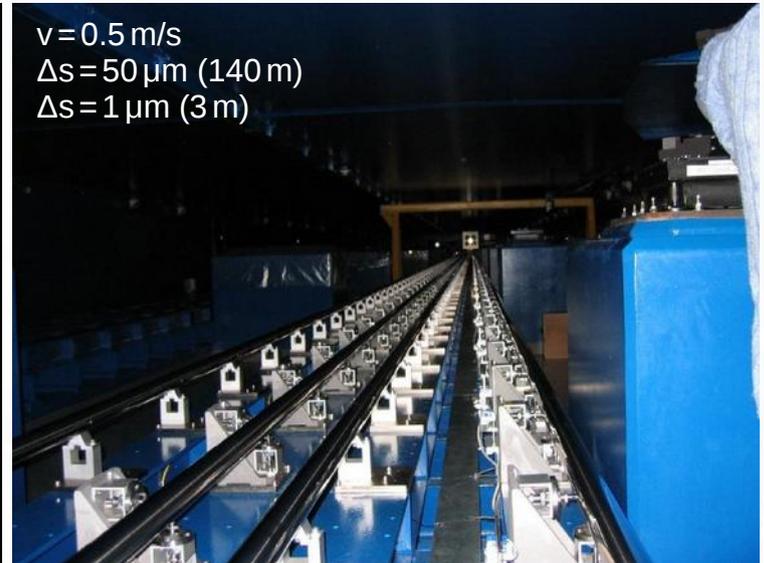
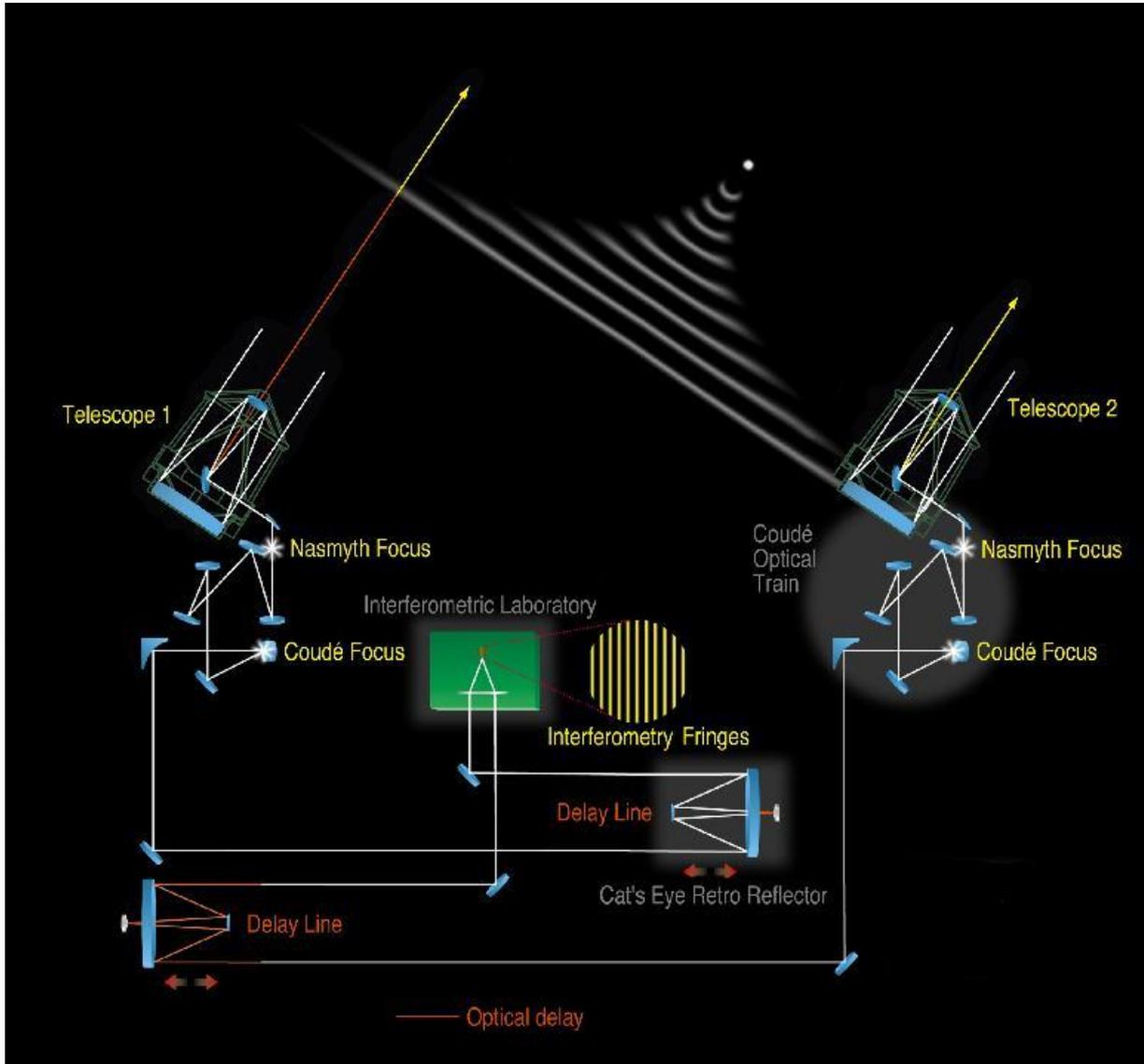
**METIS**  
Mid-infrared  
E-ELT Imager and  
Spectrograph



# Das VLT Interferometer

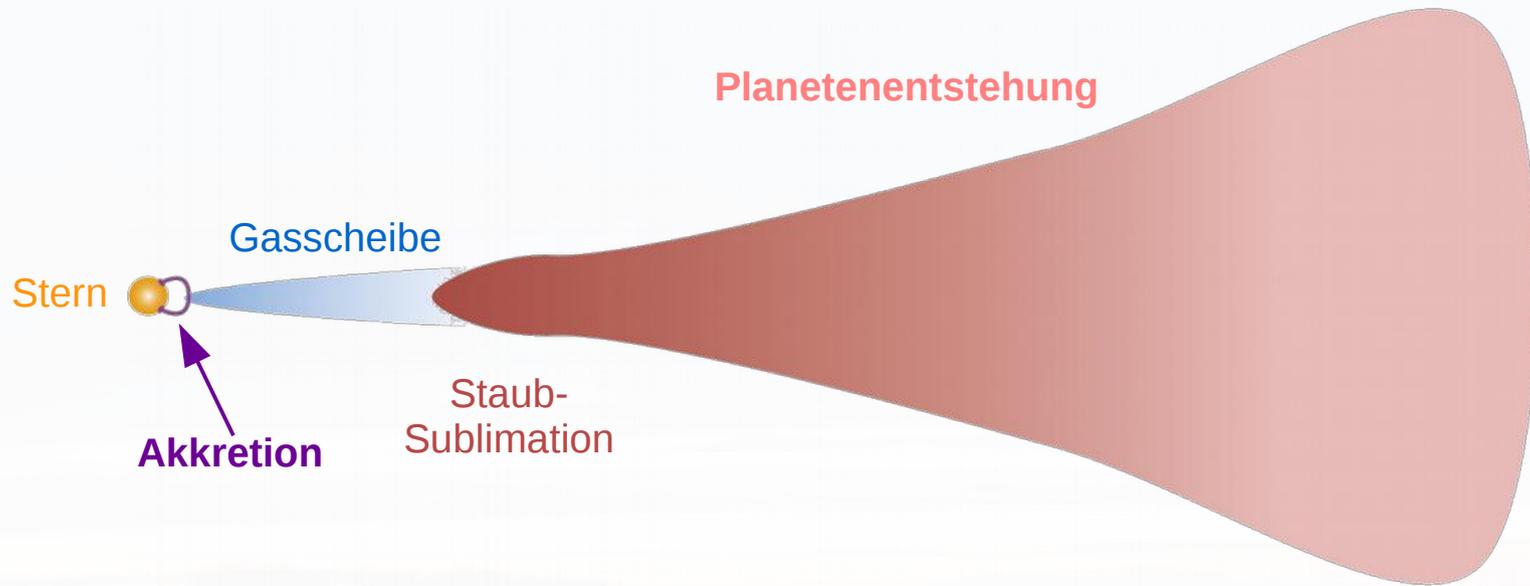


# Kombination des Lichts



Ergebnisse

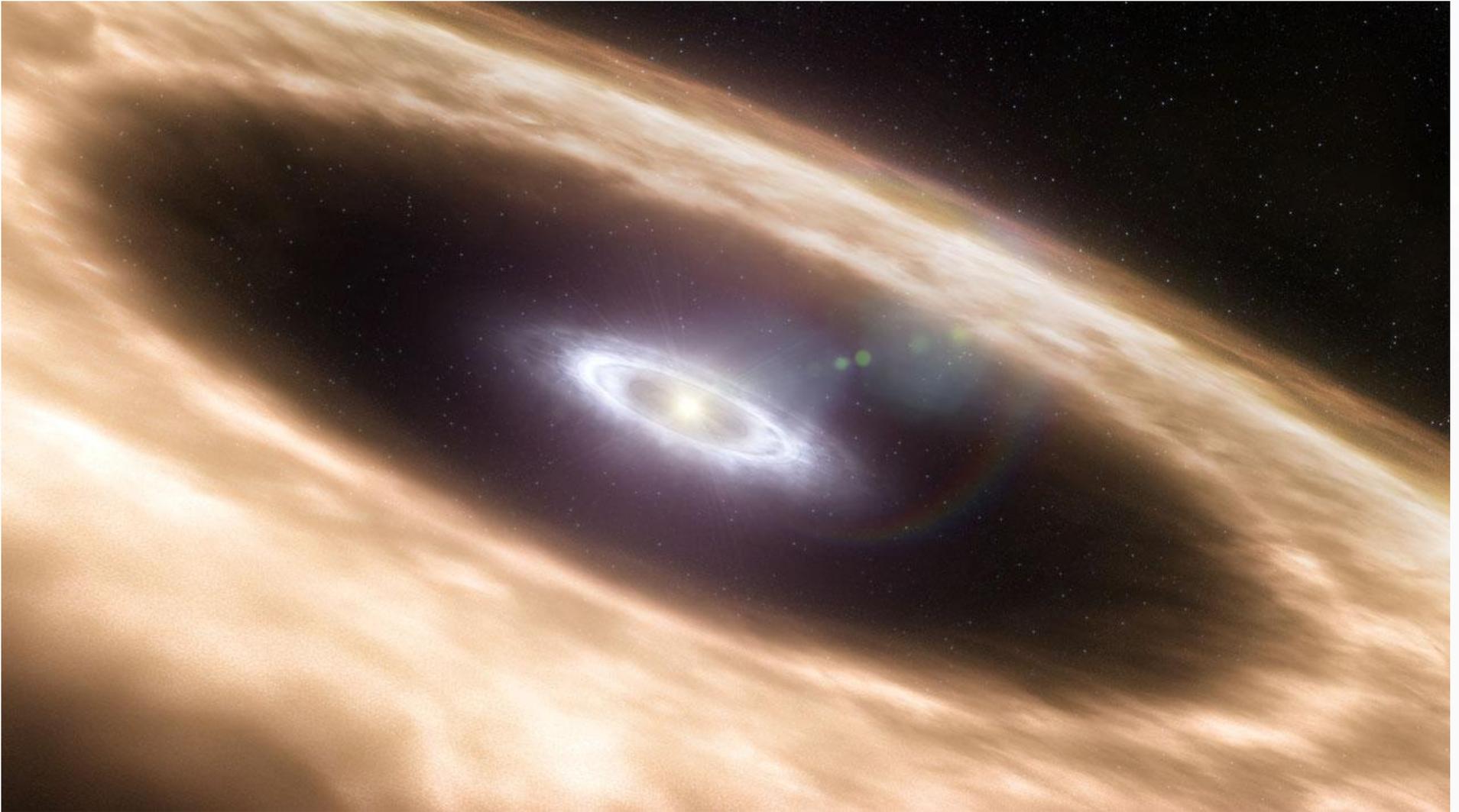
# Struktur & Entwicklung der Scheiben



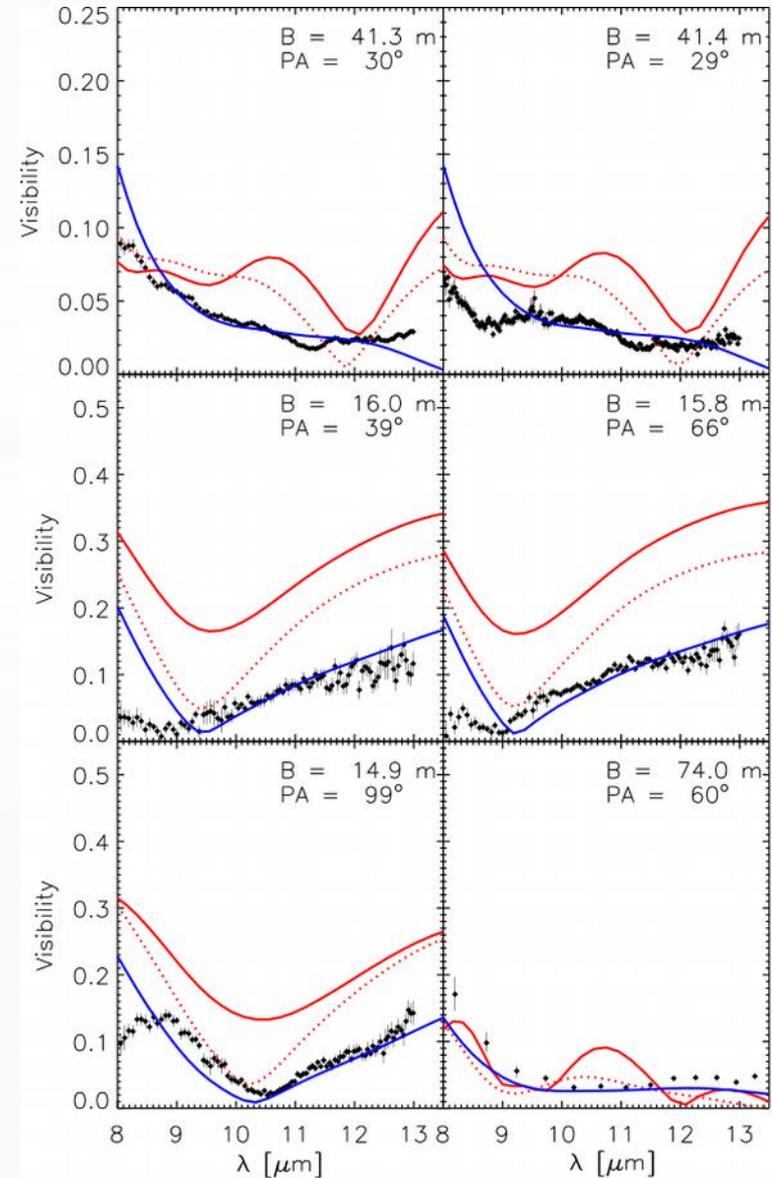
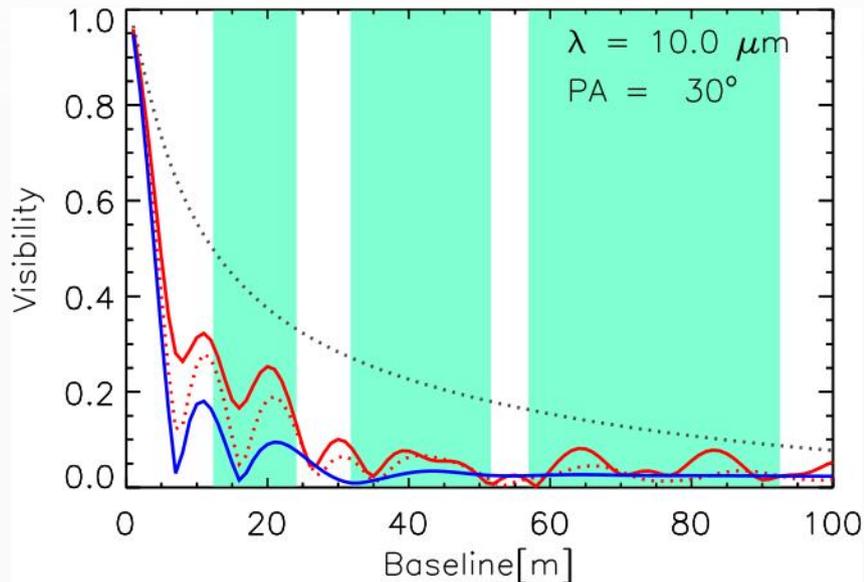
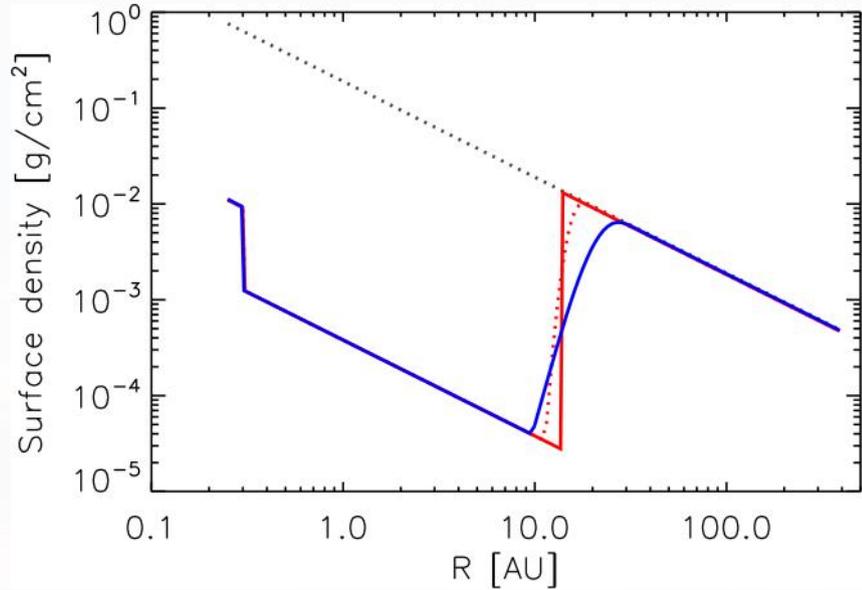
DR Tau	K7 ( $T_* \sim 4000\text{K}$ , $L_* \sim 1.7 L_\odot$ )	$M_* \sim 0.8 M_\odot$	3 Myr
	$m_d \sim 0.1 M_\odot$ , $r_d \sim 0.10 \dots 90\text{ AU}$ , $\beta \sim 0.75$ , $h_{100} \sim 15\text{ AU}$ , $i \sim 20^\circ$ , $2.0 \cdot 10^{-8} M_\odot/\text{yr}$		
GW Ori	G0 ( $T_* \sim 6000\text{K}$ , $L_* \sim 40 L_\odot$ )	$M_* \sim 3.7 M_\odot$	1 Myr
	$m_d \sim 1.0 M_\odot$ , $r_d \sim 0.35 \dots 360\text{ AU}$ , $\beta \sim 1.10$ , $h_{100} \sim 22\text{ AU}$ , $i \sim 10^\circ$ , $2.5 \cdot 10^{-7} M_\odot/\text{yr}$		
HD 72106B	A0 ( $T_* \sim 9500\text{K}$ , $L_* \sim 28 L_\odot$ )	$M_* \sim 1.8 M_\odot$	10 Myr
	$m_d \sim 0.005 M_\odot$ , $r_d \sim 0.50 \dots 40\text{ AU}$ , $\beta \sim 1.30$ , $h_{100} \sim 8\text{ AU}$ , $i \sim 60^\circ$ , no accretion		
RU Lup	K8 ( $T_* \sim 4000\text{K}$ , $L_* \sim 1.3 L_\odot$ )	$M_* \sim 0.8 M_\odot$	1 Myr
	$m_d \sim 0.1 M_\odot$ , $r_d \sim 0.10 \dots 100\text{ AU}$ , $\beta \sim 0.90$ , $h_{100} \sim 20\text{ AU}$ , $i \sim 28^\circ$ , $1 \cdot 10^{-8} M_\odot/\text{yr}$		

... und viele mehr ...

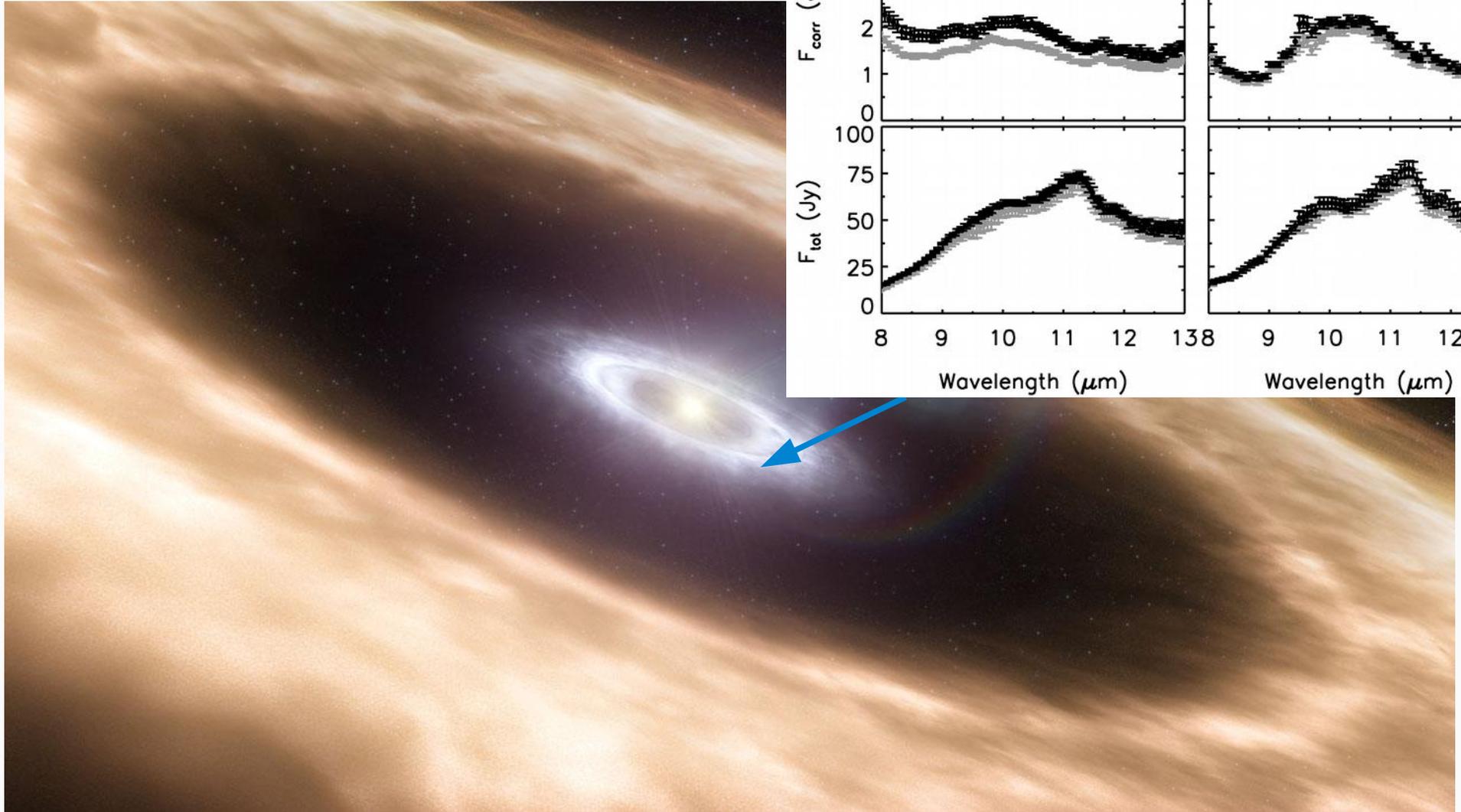
# Eine Scheibe um einen leuchtkräftigen Stern



# Eine Scheibe um einen leuchtkräftigen Stern

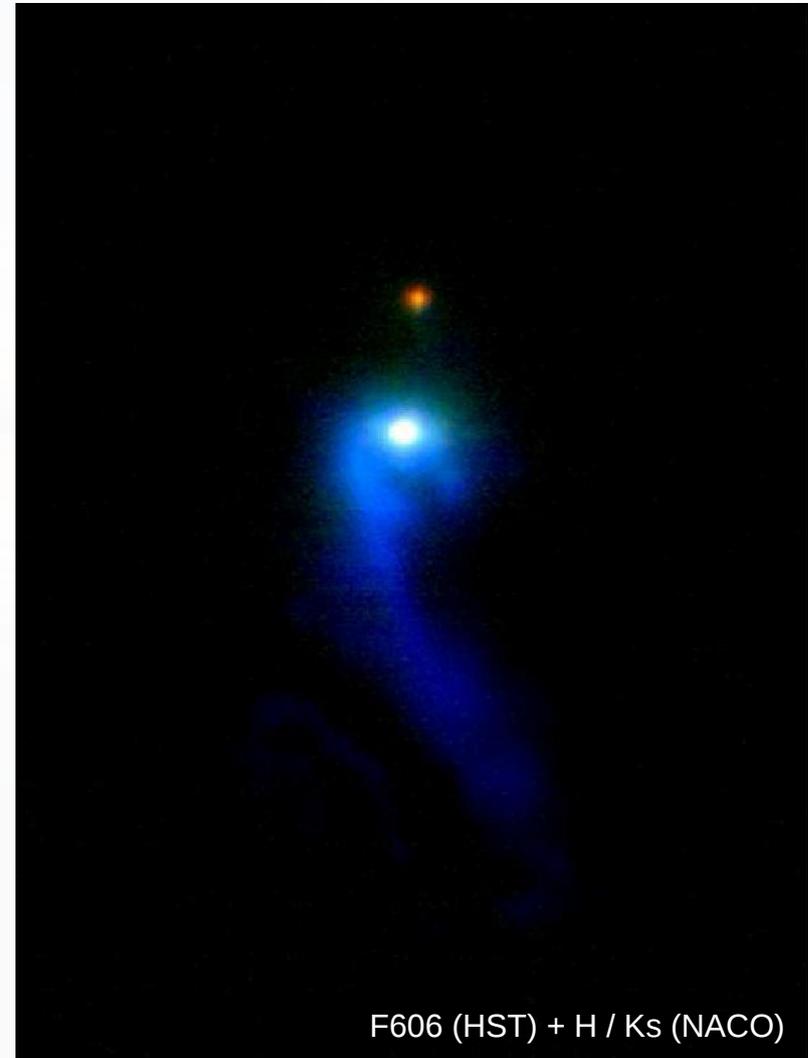


# Eine Scheibe um einen leuchtkräftigen Stern

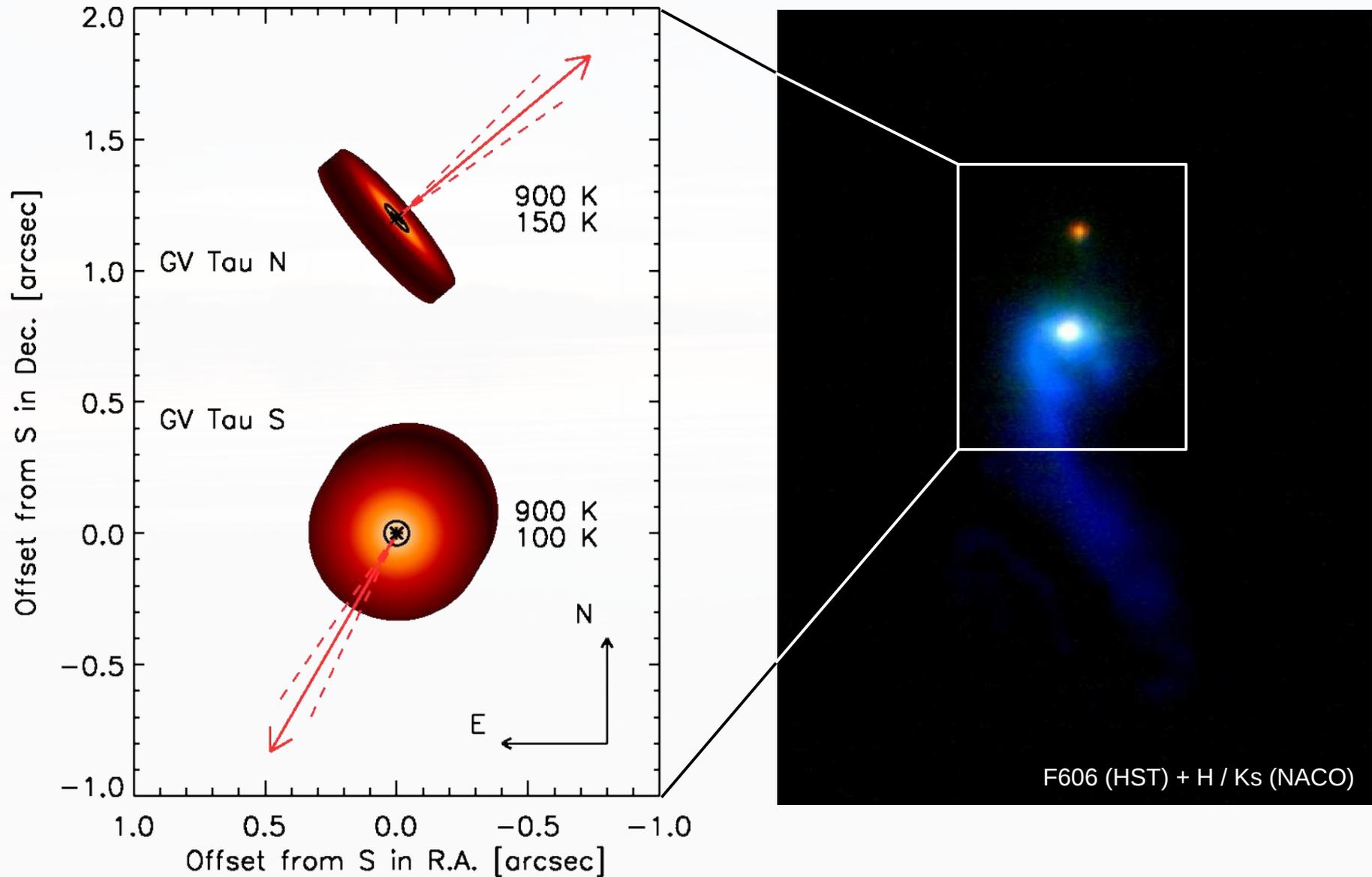


# GV Tau – ein seltsamer Doppelstern

- Doppelstern mit einem scheinbaren Abstand von 1.2"
- Entfernung: 140 – 160 pc
- variabel auf kurzen Zeitskalen
  - Inhomogenitäten in der Scheibe um die südliche Komponente?
  - variable Akkretion der nördlichen Komponente?
- Vorhandensein einer Hülle um das Doppelsternsystem wurde vorgeschlagen



# GV Tau – ein seltsamer Doppelstern



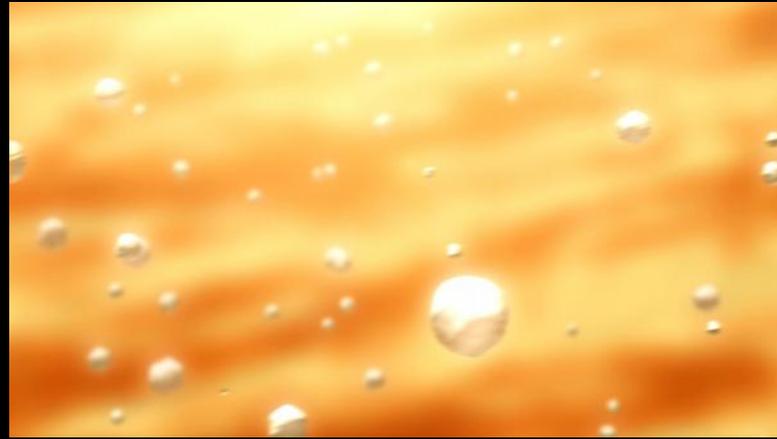


Ergebnisse

# Wie entstehen Planeten?



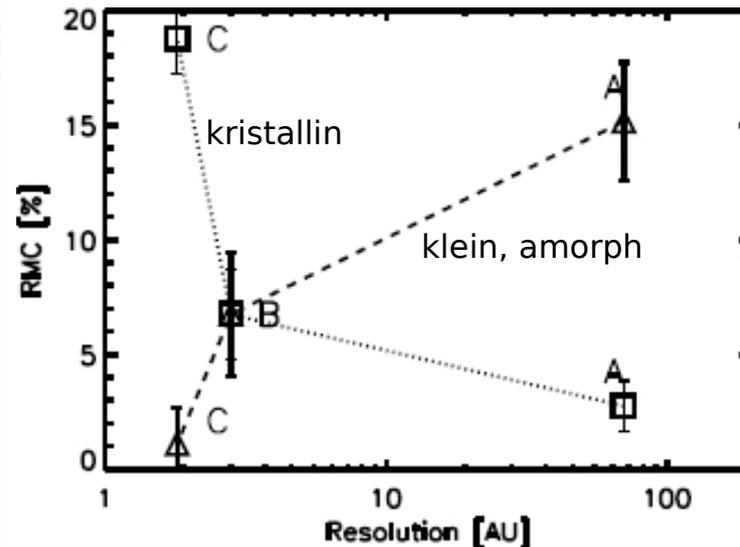
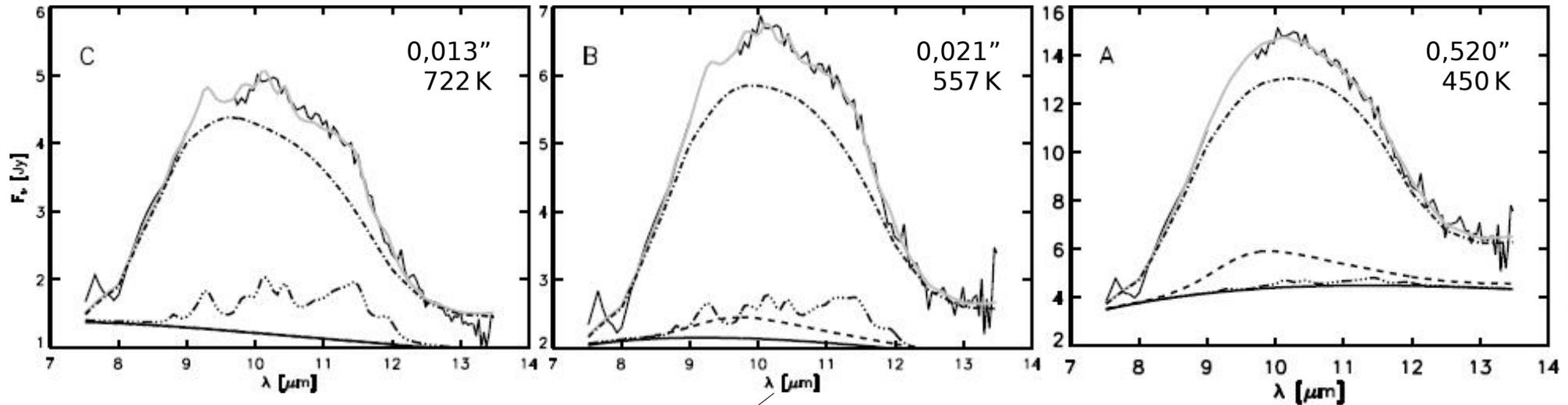
1 AU



1 AU



# Staubentwicklung in der Scheibe um RY Tau





Oje!Oje!





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