

Der Entstehung von Planeten auf der Spur

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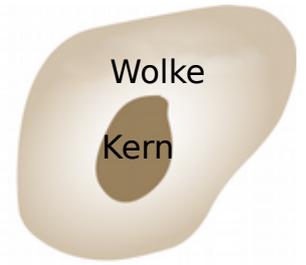
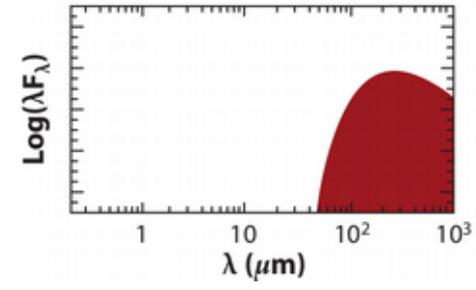




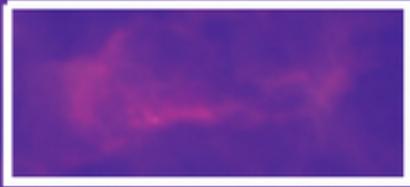
Einleitung

Wie entstehen Planeten?

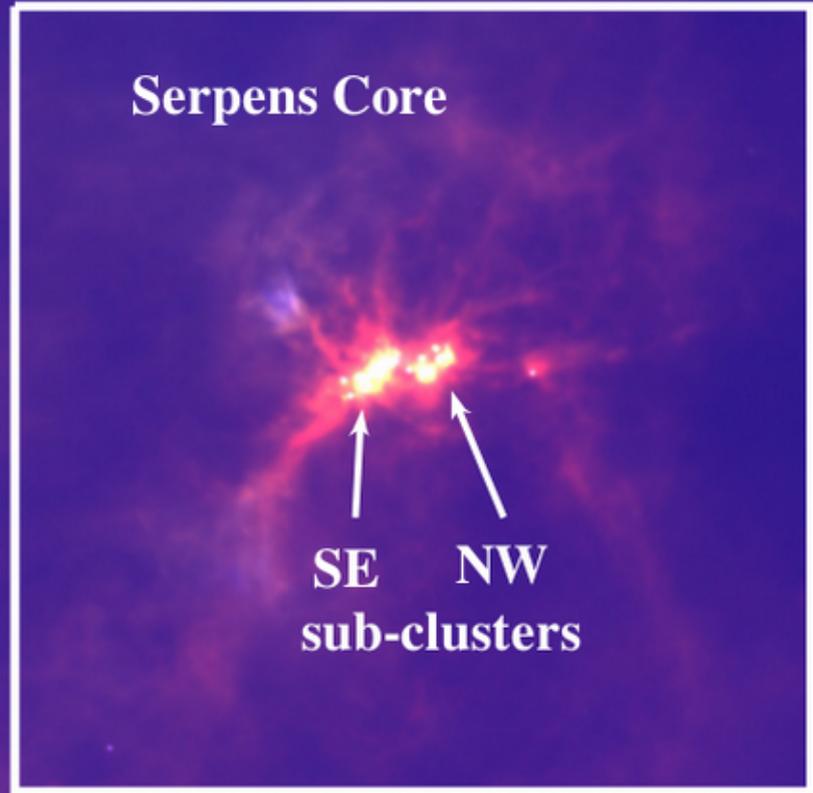
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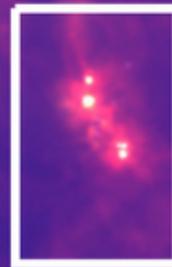
LDN 583



Serpens Core



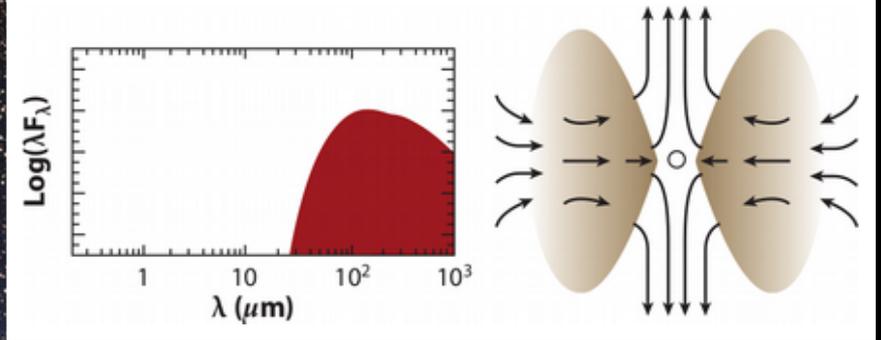
SE NW
sub-clusters

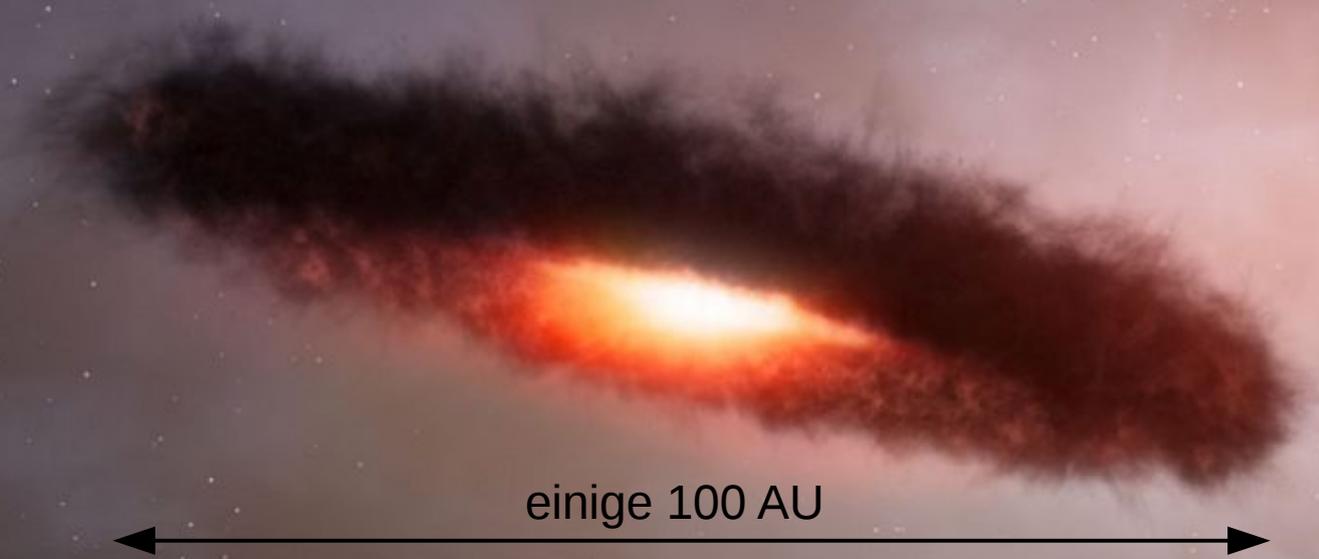
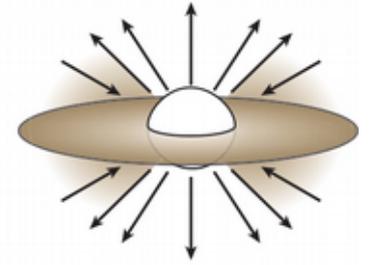
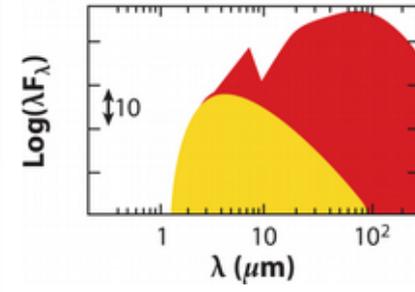


Ser G3-G6

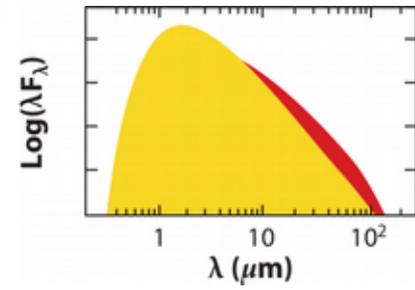
70 μm
170 μm
250 μm
PACS/SPIRE

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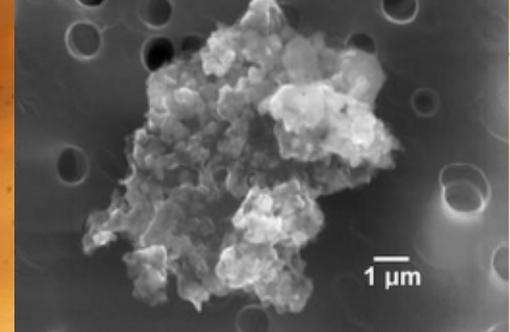


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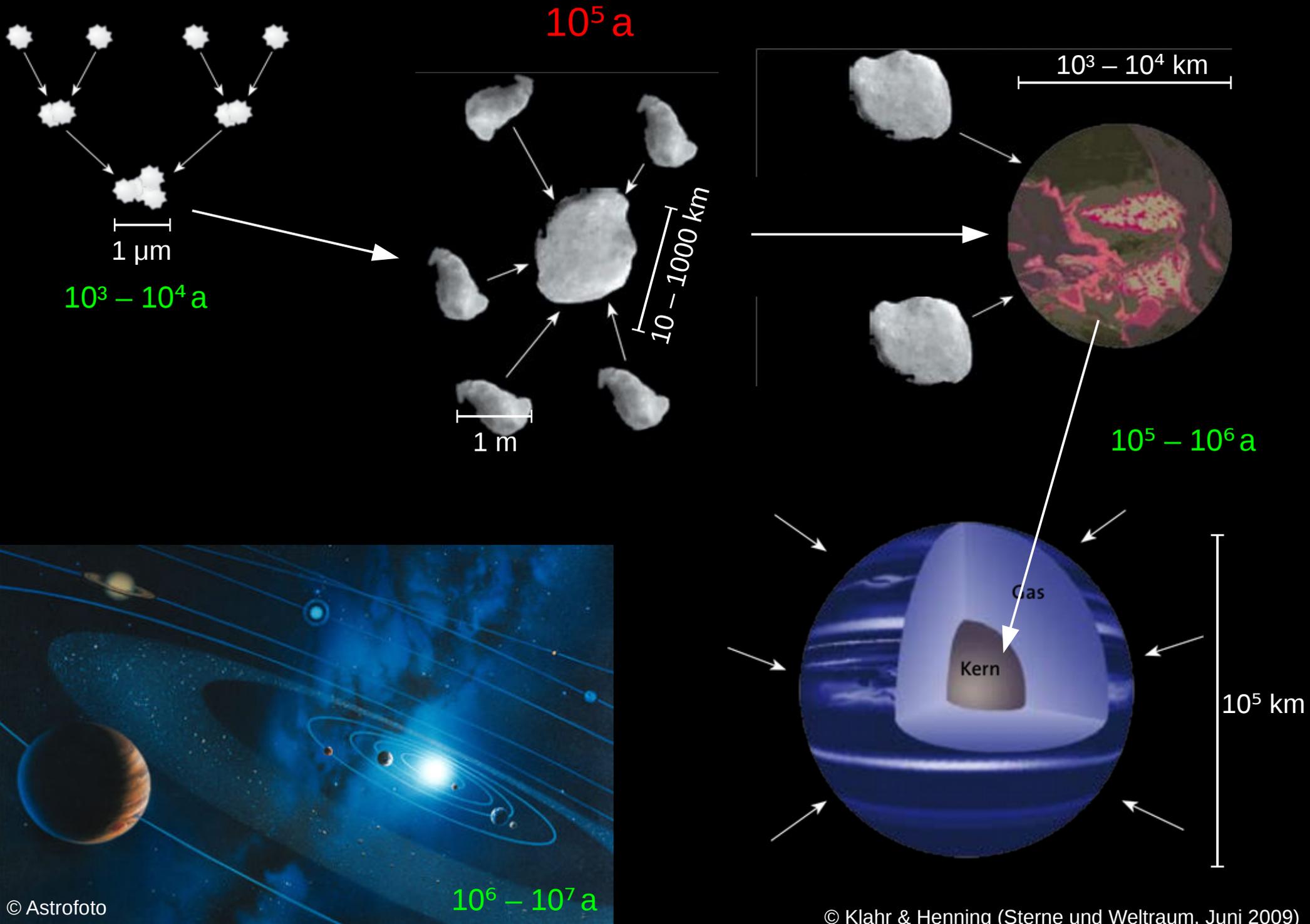


1 ... 10 AU

© NASA Johnson Space Center

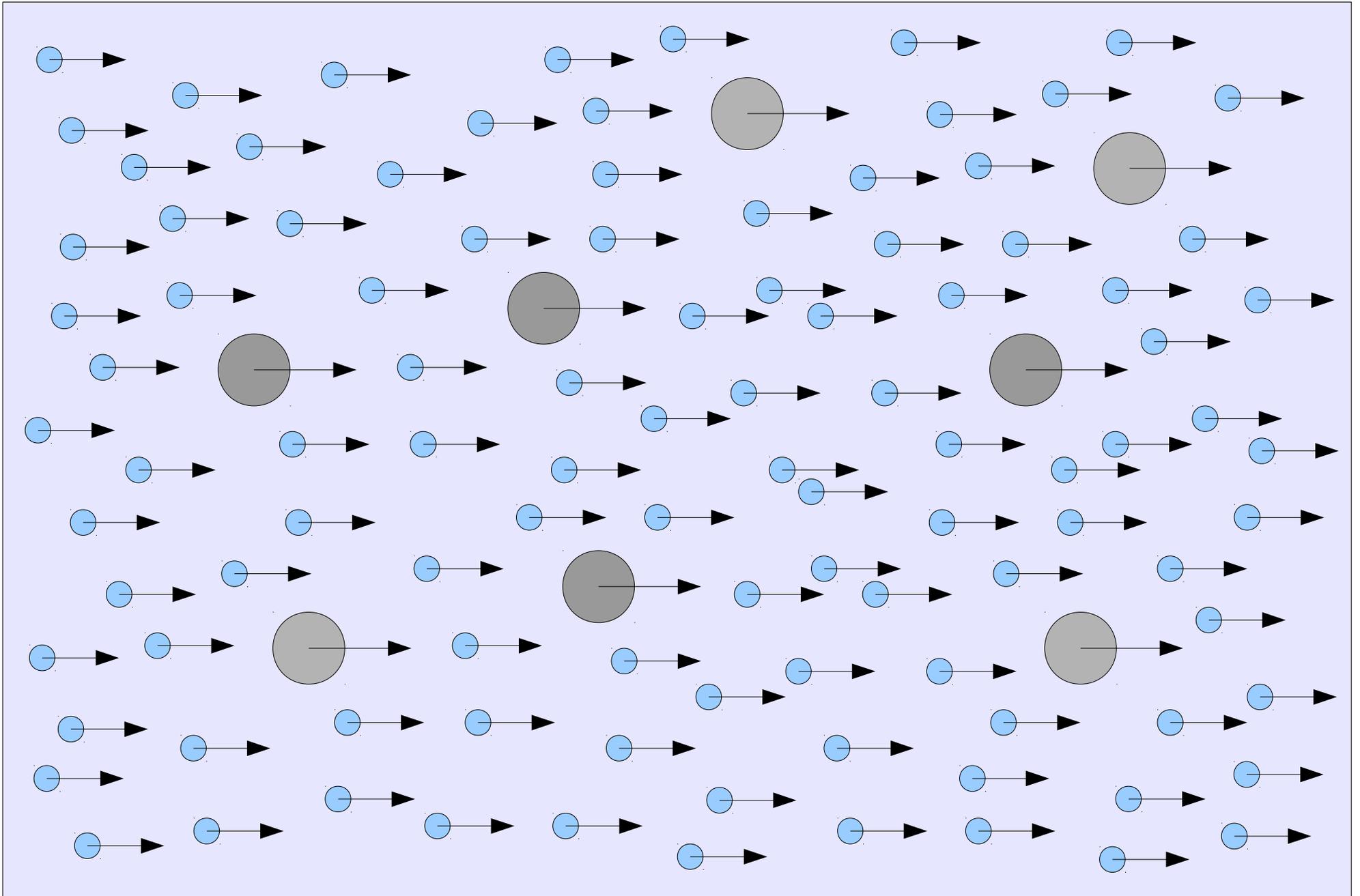


© Alexander Seizinger



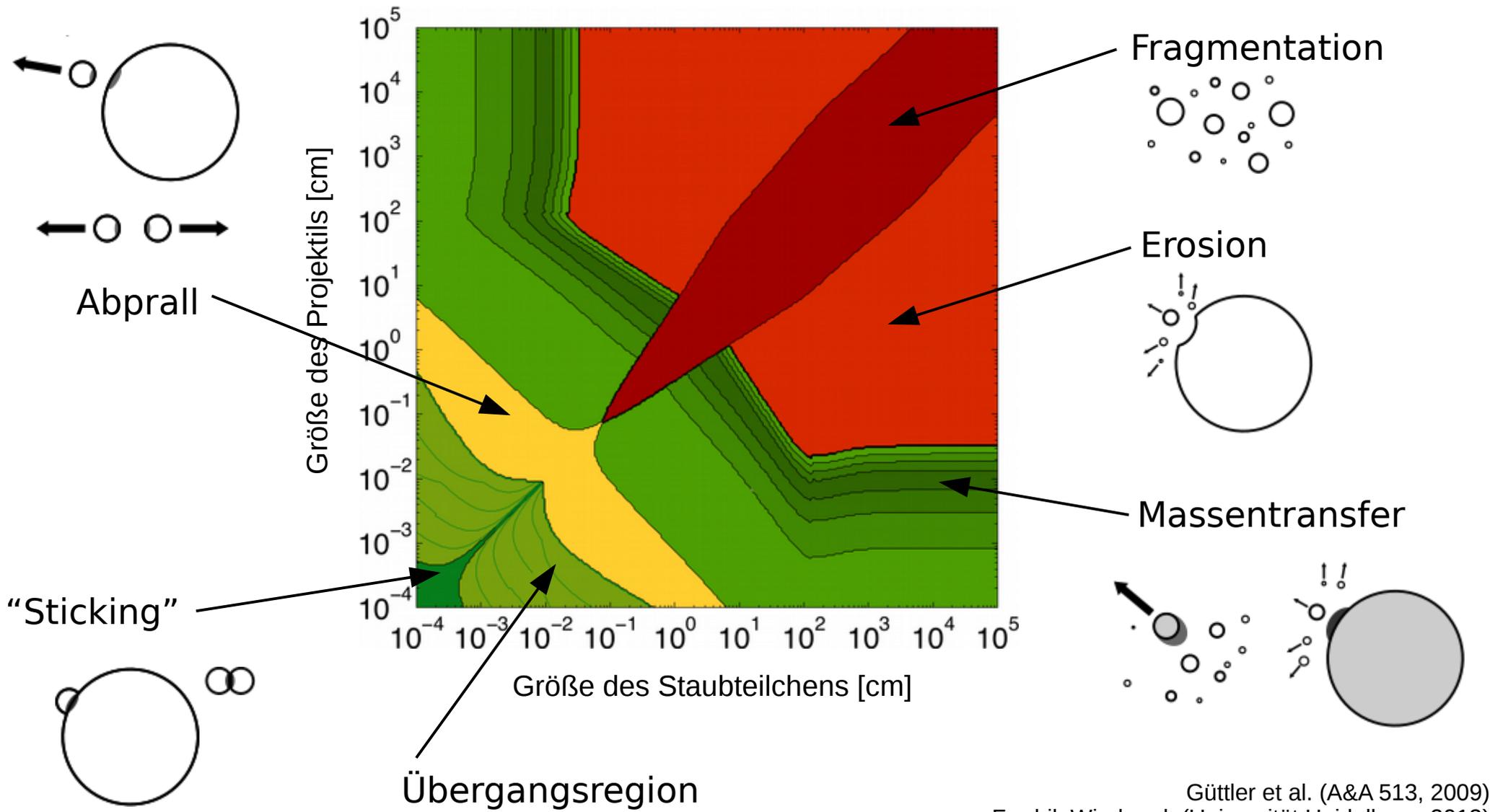
Die Details

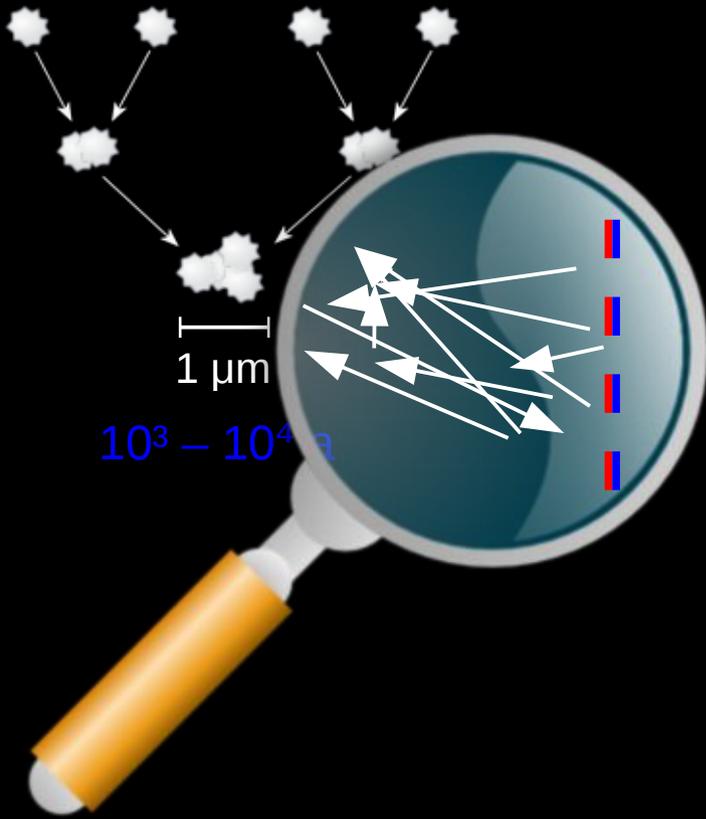
Was passiert wirklich in einer Scheibe?



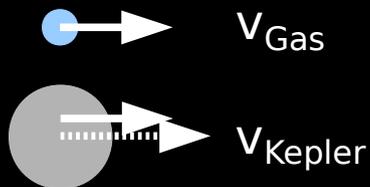
Beitrag zur Masse: $1/100 \rightarrow$ auf 1 Million Gasteilchen kommt ein Staubteilchen

Teilchenwachstum





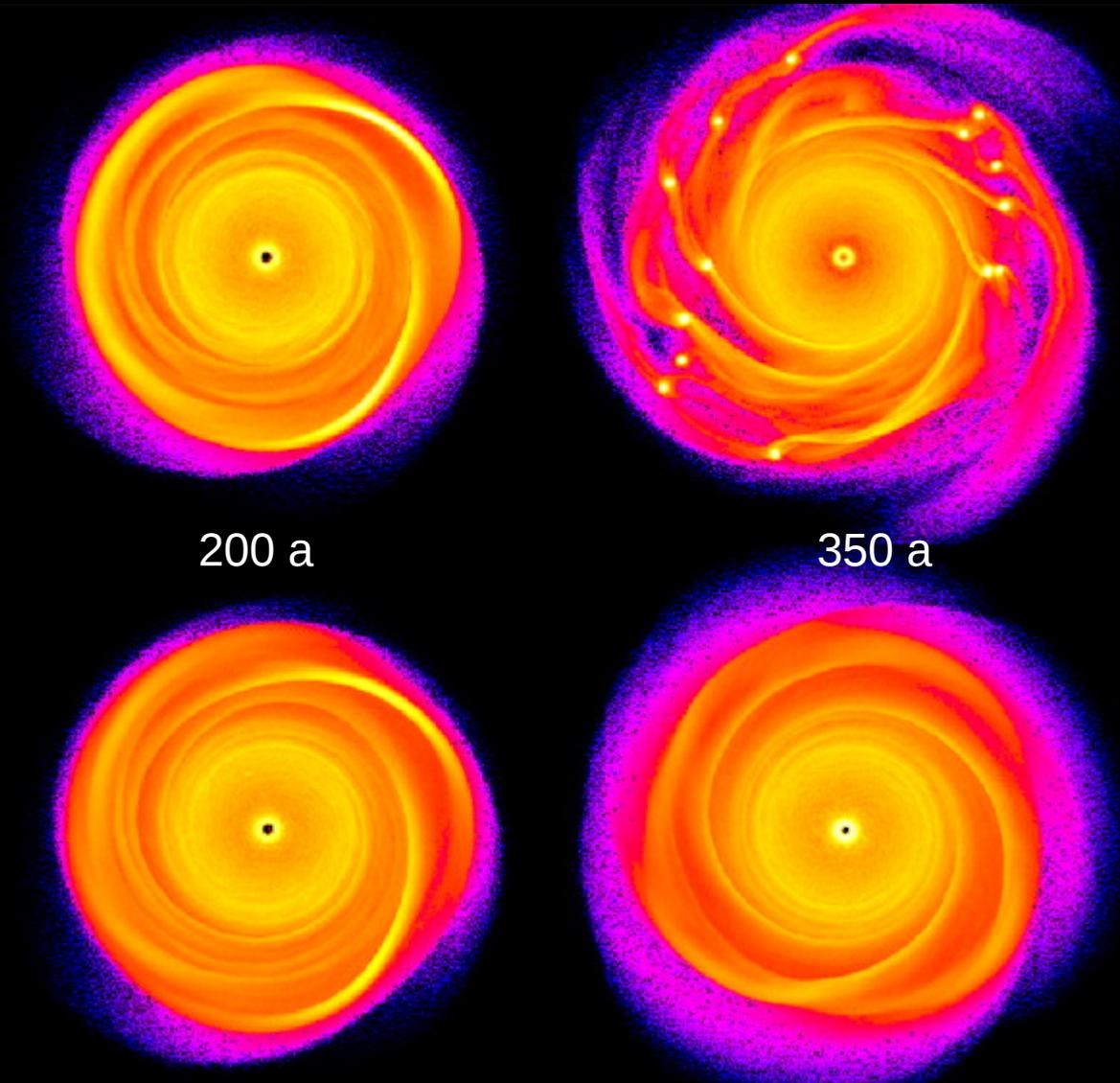
“Meter-Size Barrier”
 “Radial-Drift Barrier”



“Vortices”

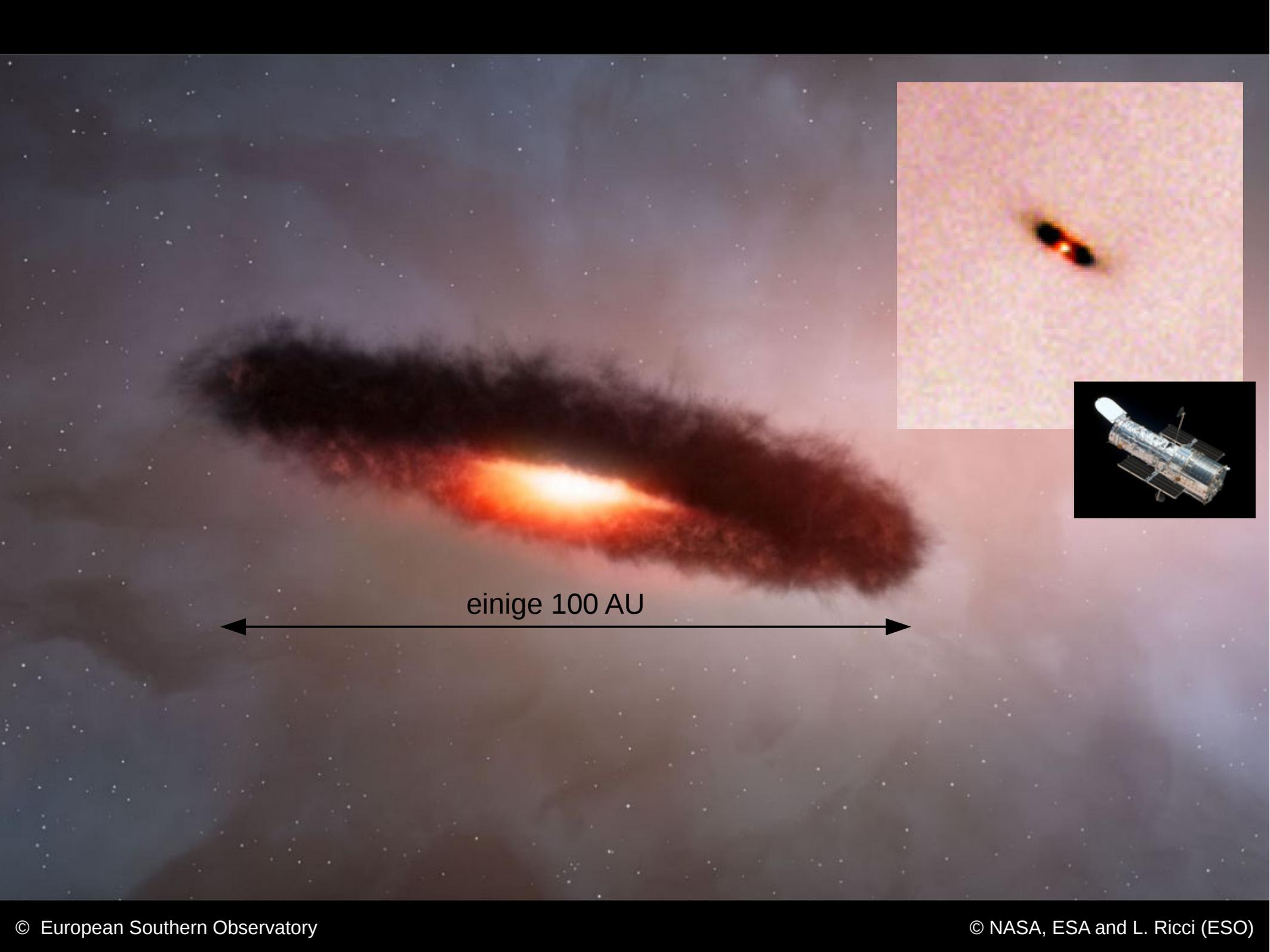


Scheibeninstabilitäten



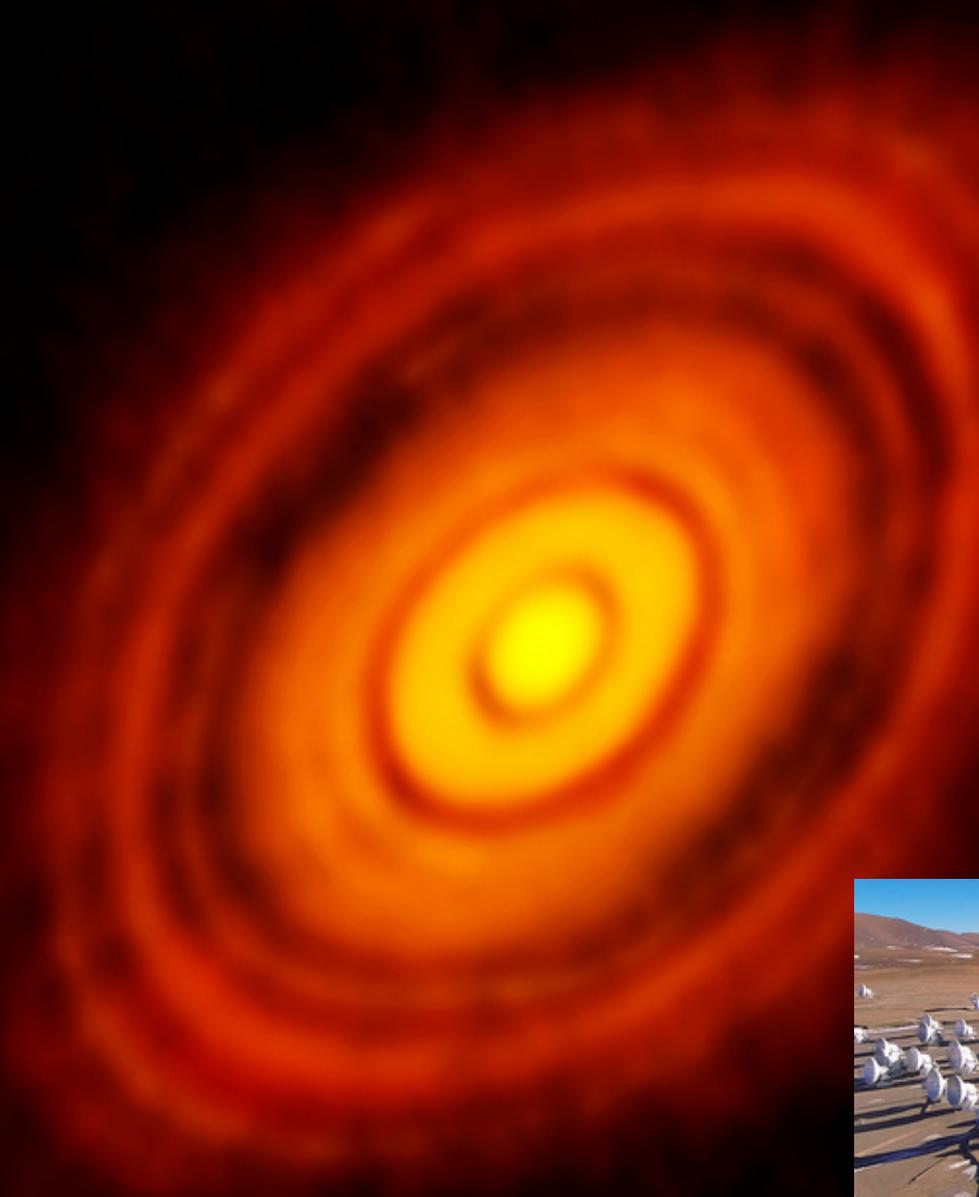
Beobachtungen

Können wir etwas davon sehen?

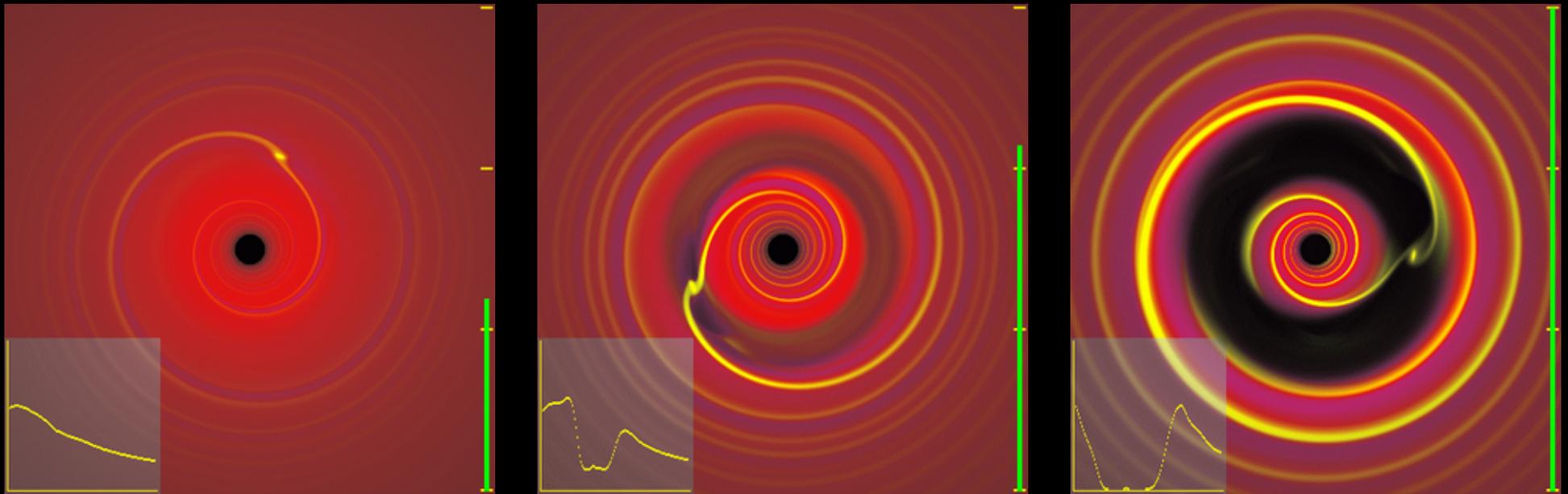


einige 100 AU

HL Tau



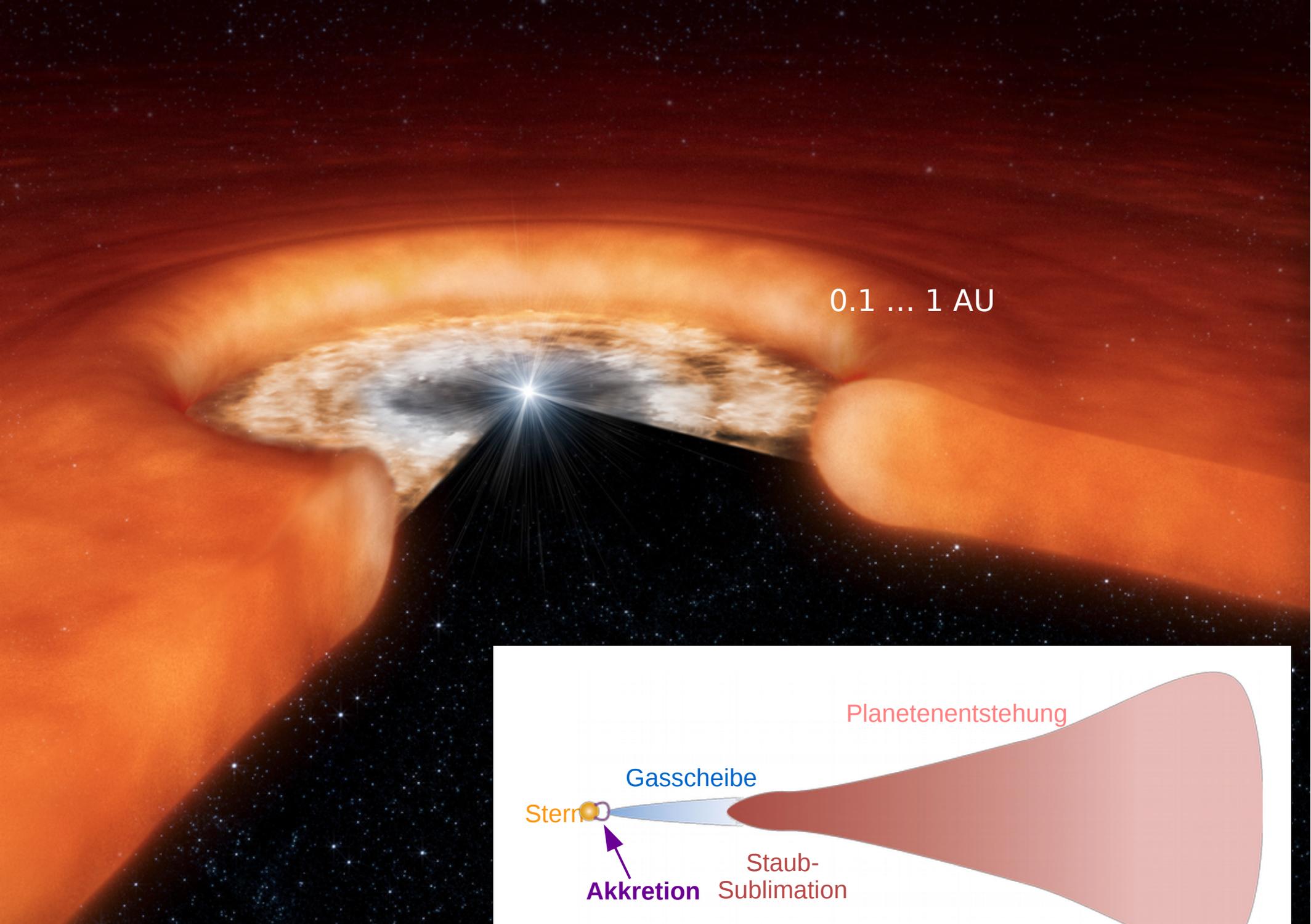
Planeten hinterlassen "Gaps"



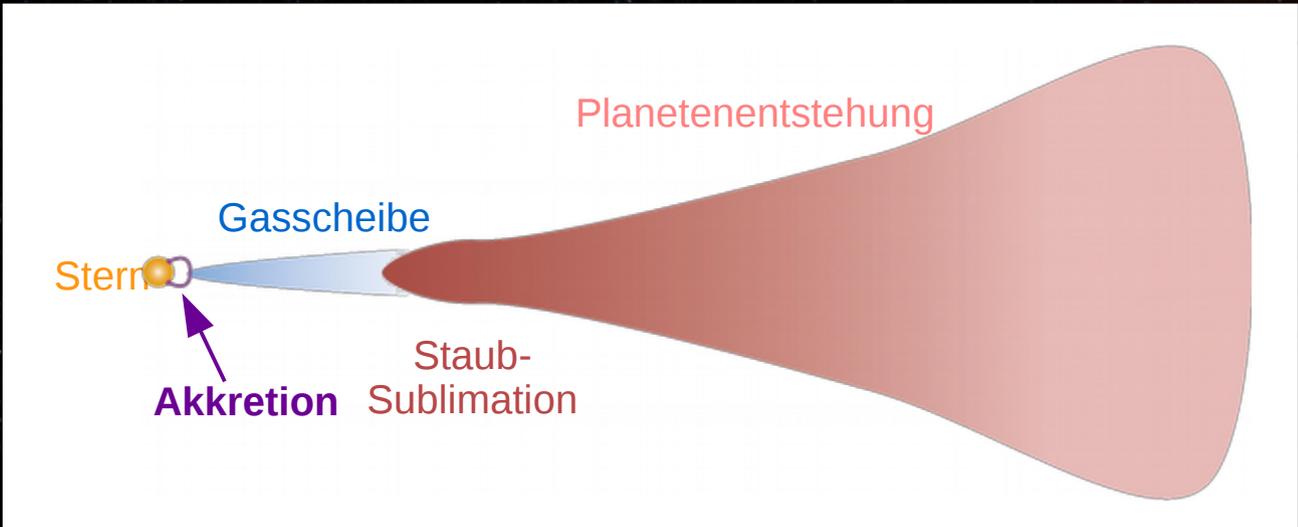
Magneto-hydrodynamische Simulation

Abstand des Planeten wird konstant gehalten

600 Umläufe: $3 \rightarrow 10 M_{\text{Jupiter}}$



0.1 ... 1 AU

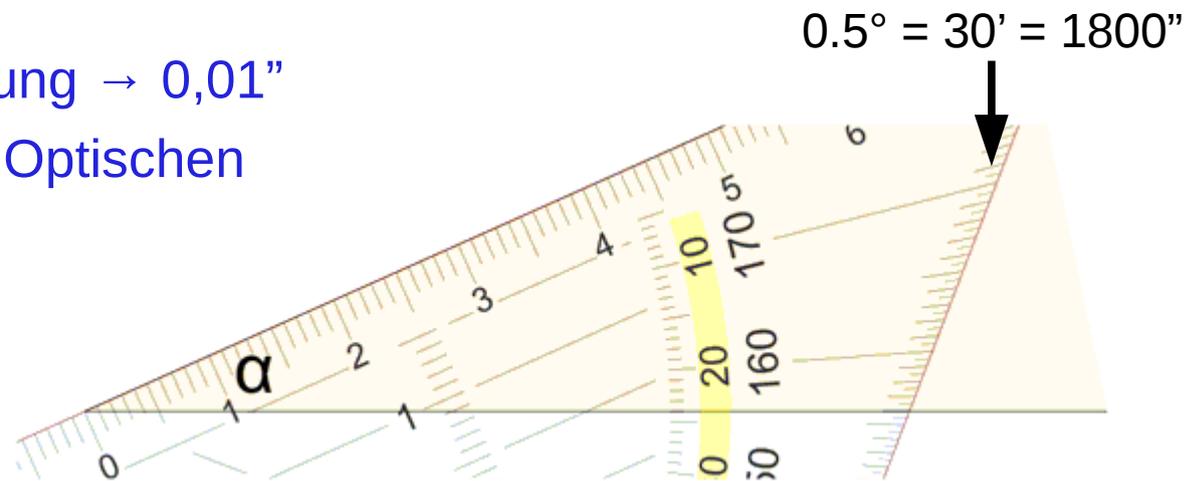


Wie groß erscheint uns eine Scheibe?

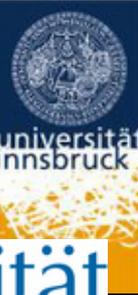
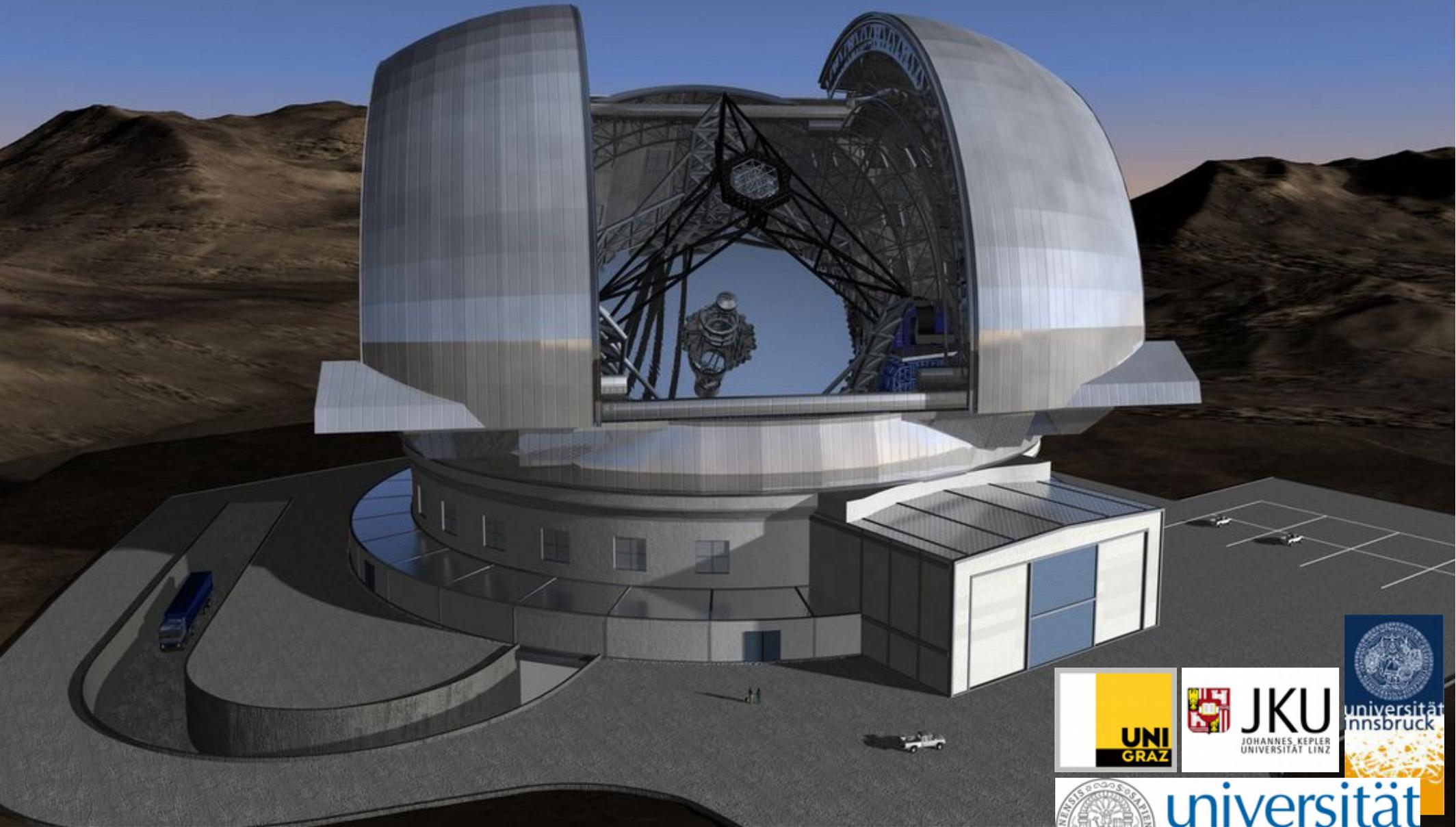
			1 AE = 149,6 Millionen km	
äußerer Bereich:	100,00 AE	→	1,0"	(in 100 pc Entfernung)
Gasriesen:	10,00 AE	→	0,1"	
Sonne – Erde:	1,00 AE	→	0,01"	
Durchmesser Sonne:	0,01 AE	→	0,0001"	
				1 pc = 206.265 AU = 30860 Milliarden km



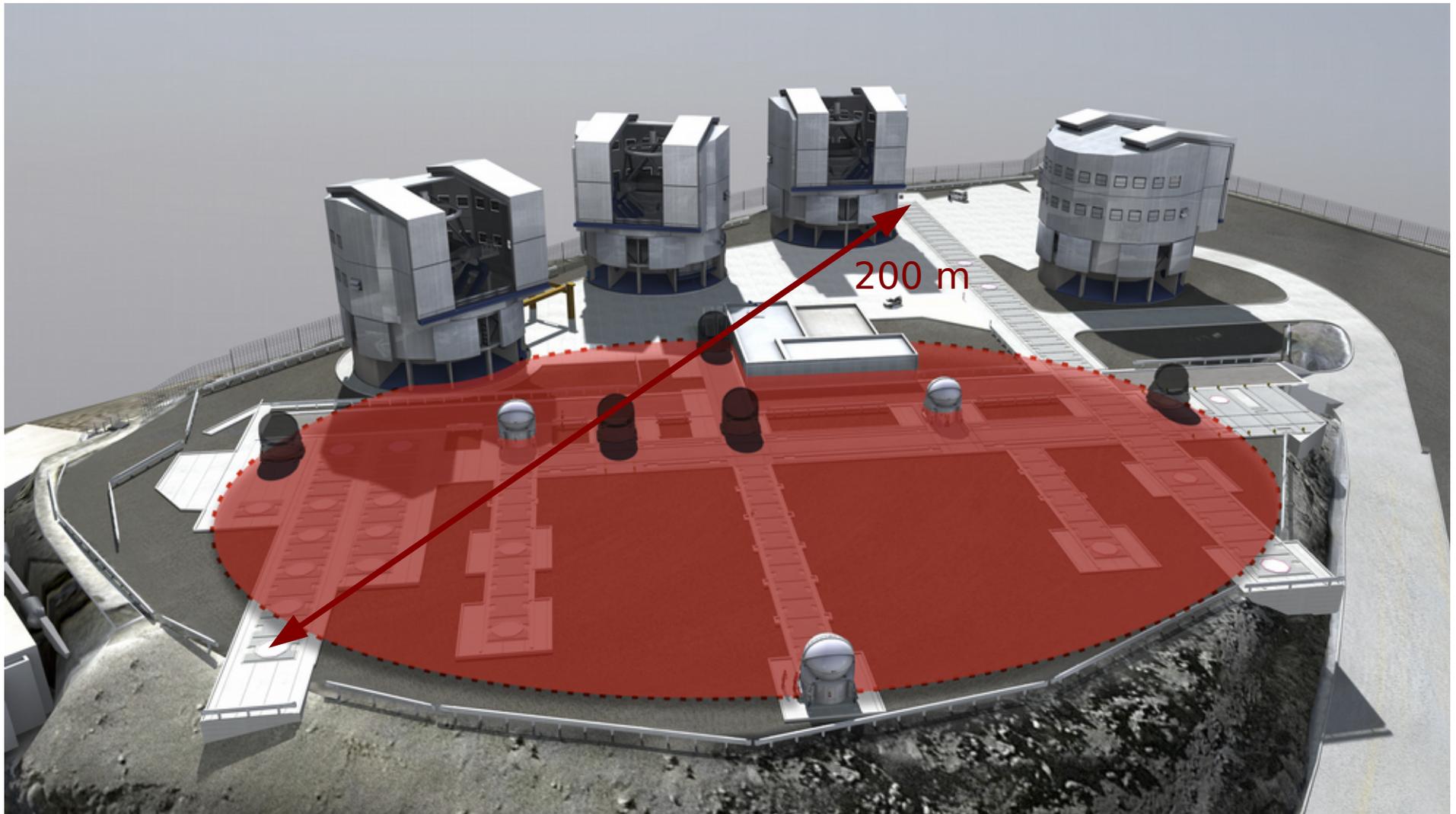
in 500 km Entfernung → 0,01"
10 m-Teleskop im Optischen

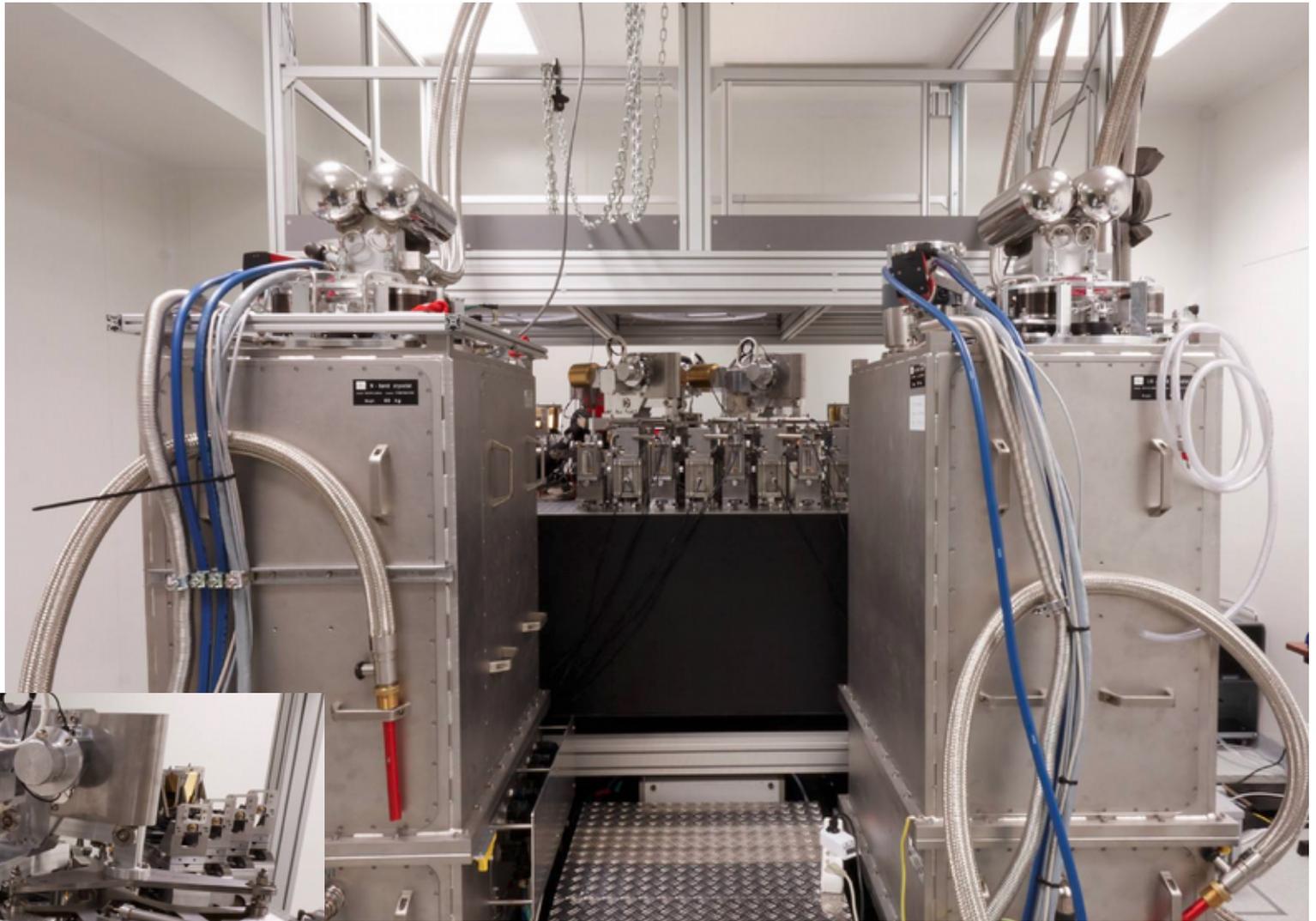


2 μm (1500 K): 0.01"
10 μm (300 K): 0.05"



Das VLT Interferometer

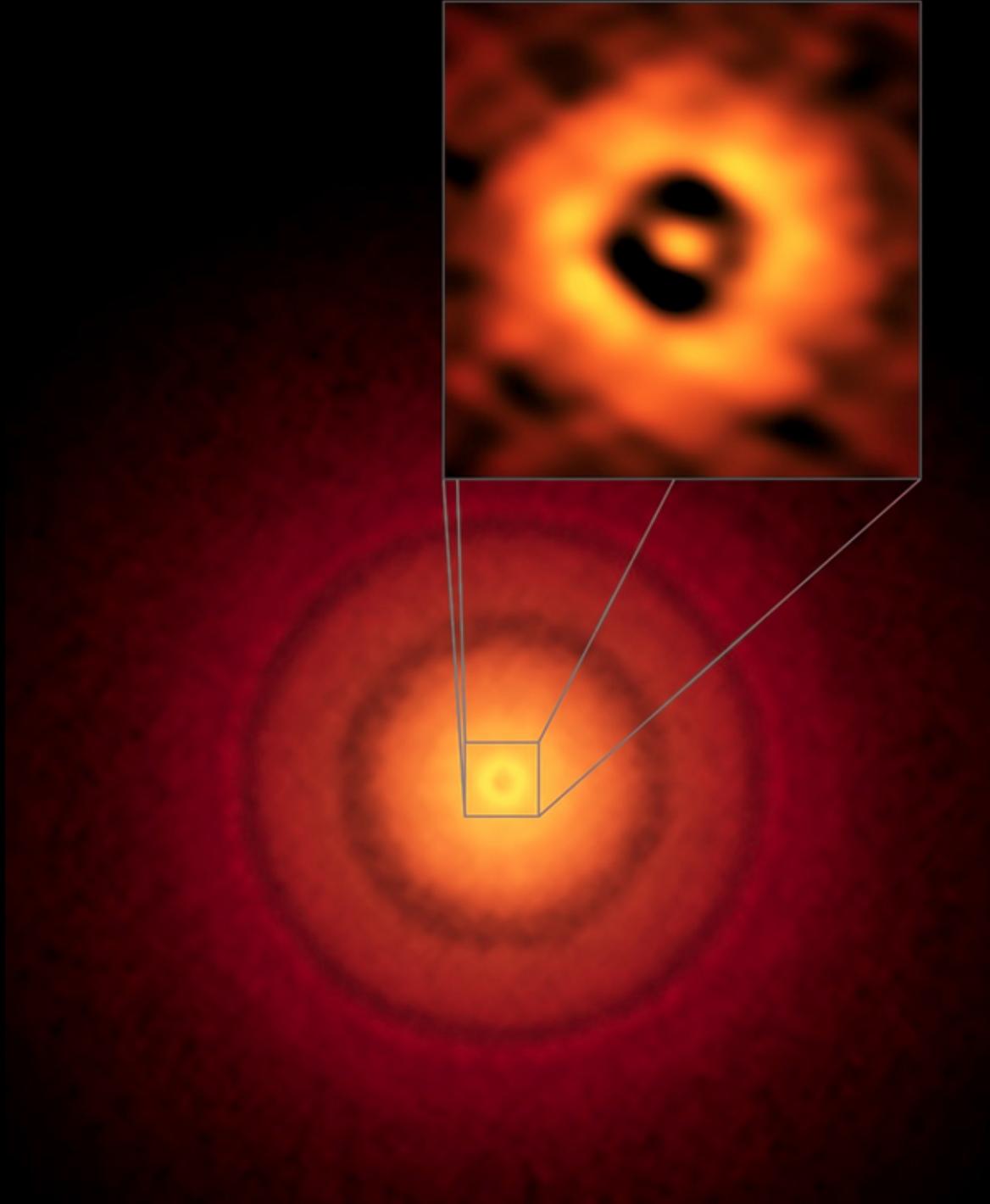




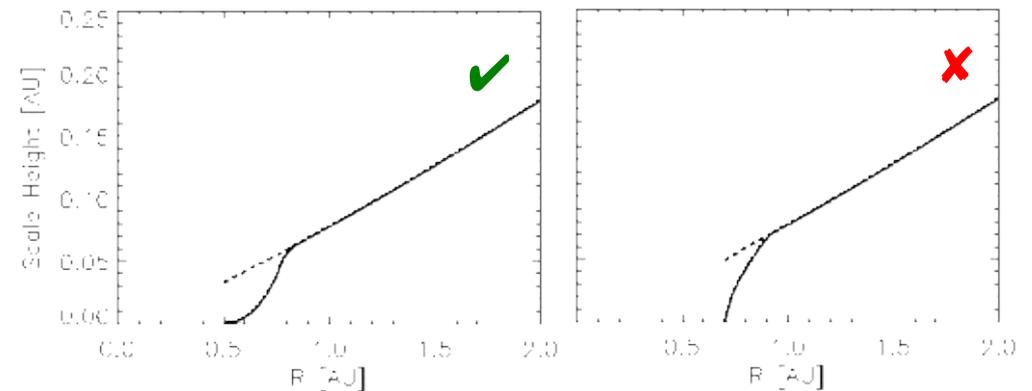
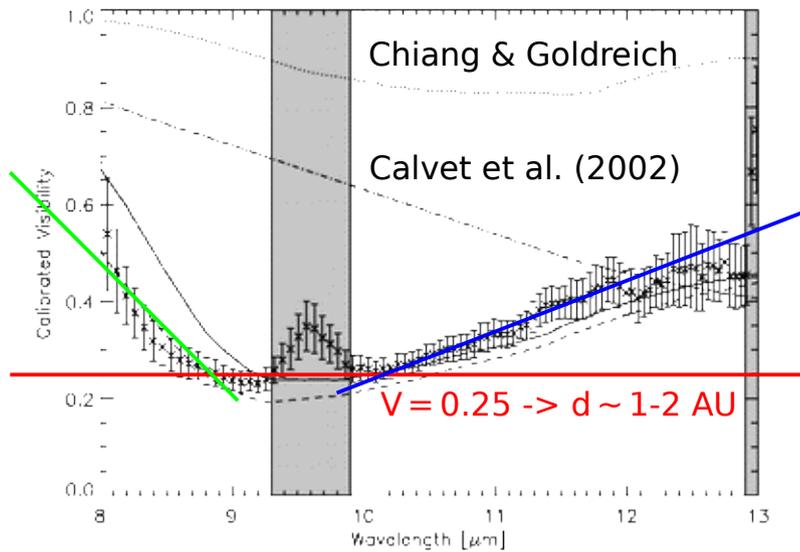
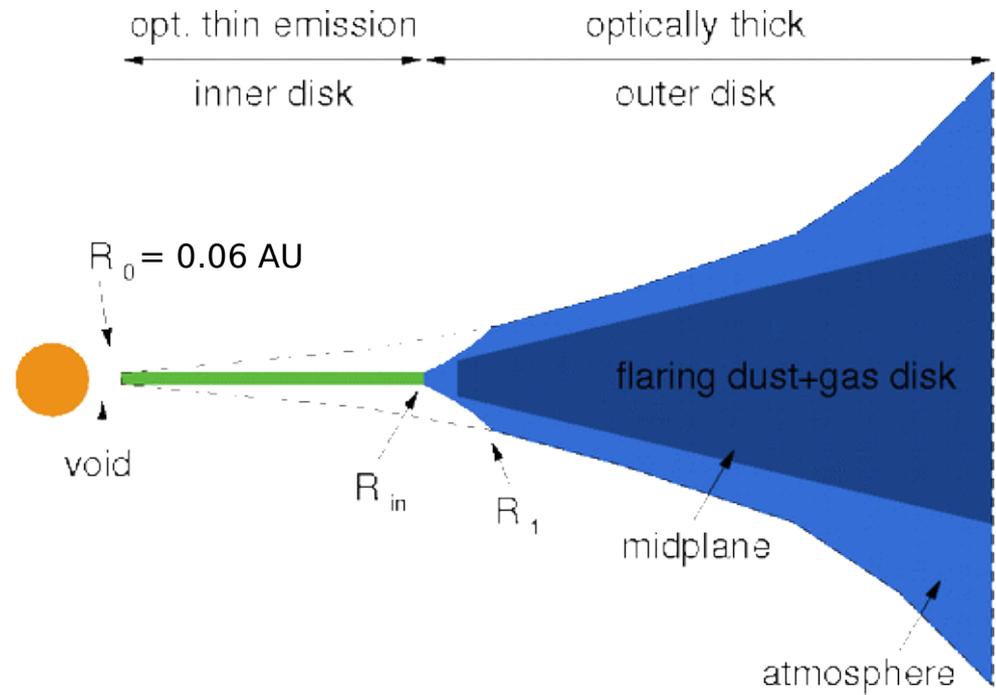
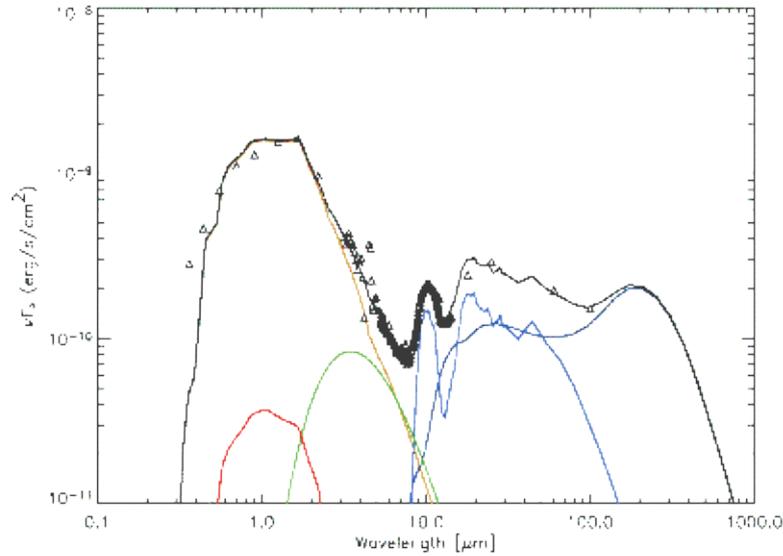
Bisherige Ergebnisse

Was ist schon beobachtet worden?

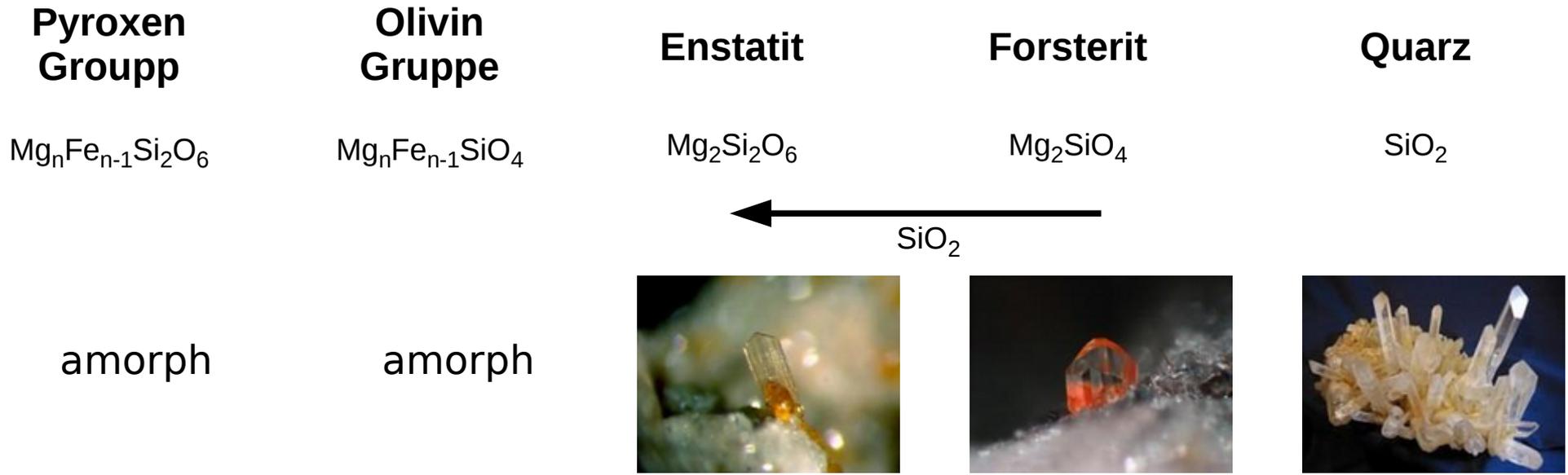
TW Hya



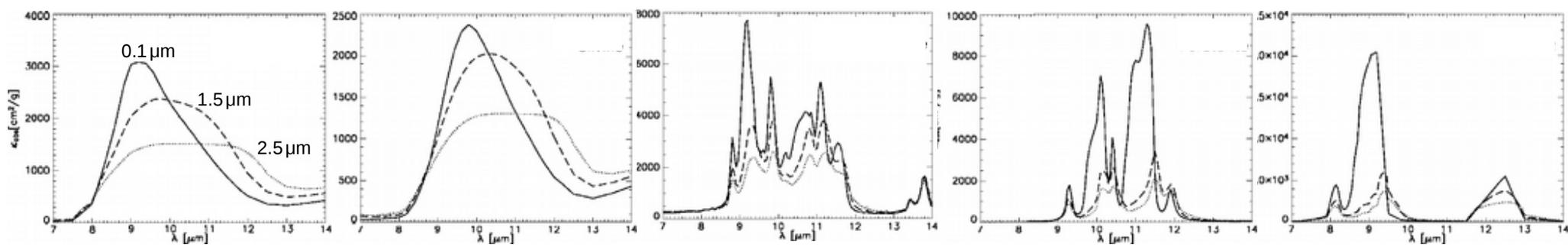
TW Hya – Die Struktur der Scheibe



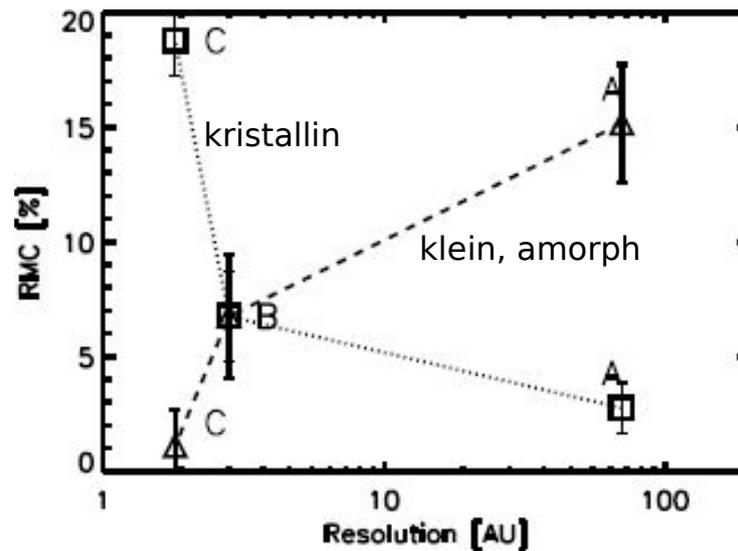
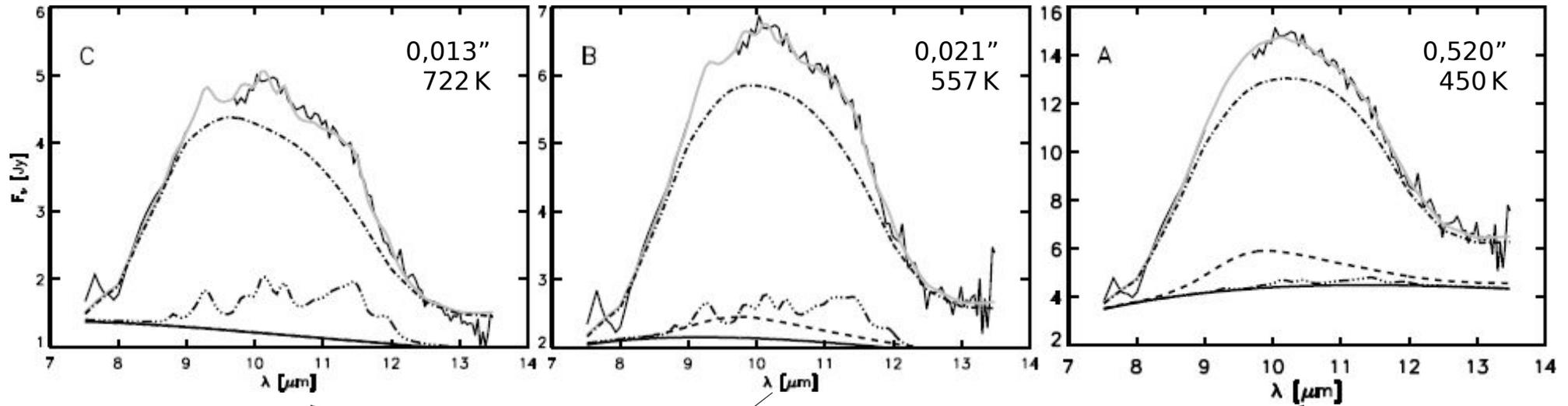
Staubteilchen wachsen



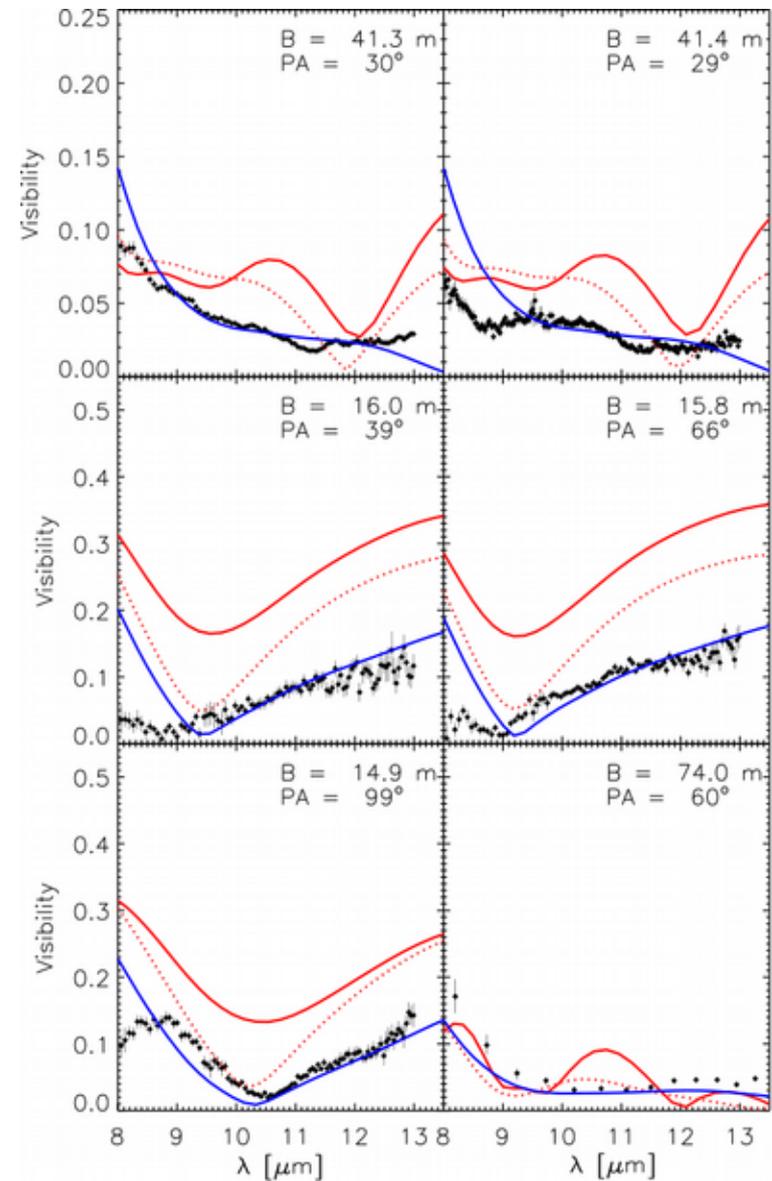
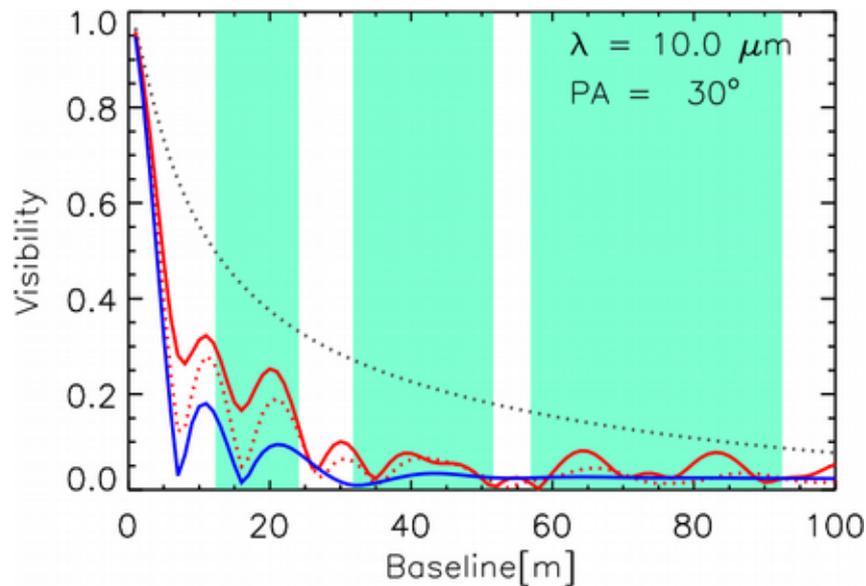
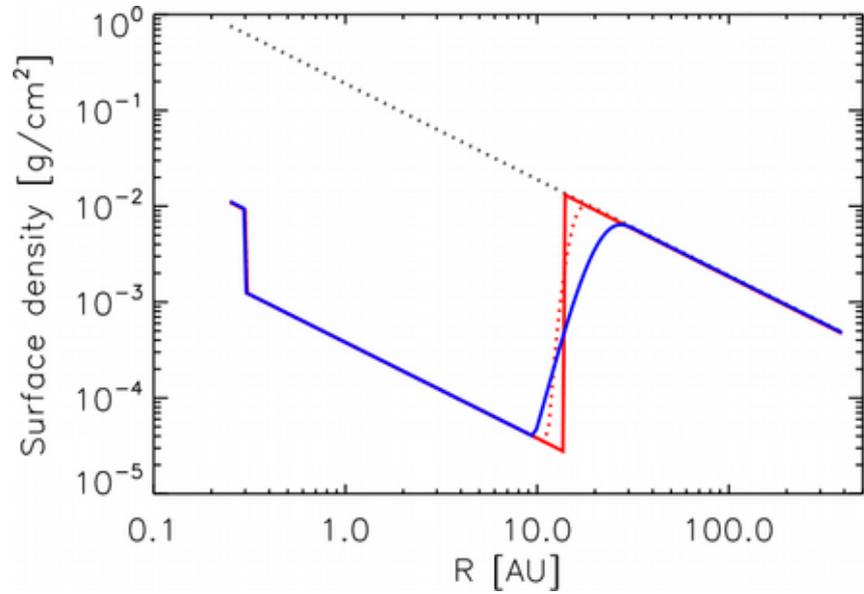
→ Umwandlung / thermische Stabilität



Staubteilchen wachsen



Planeten hinterlassen "Gaps"



Planeten hinterlassen "Gaps"

