

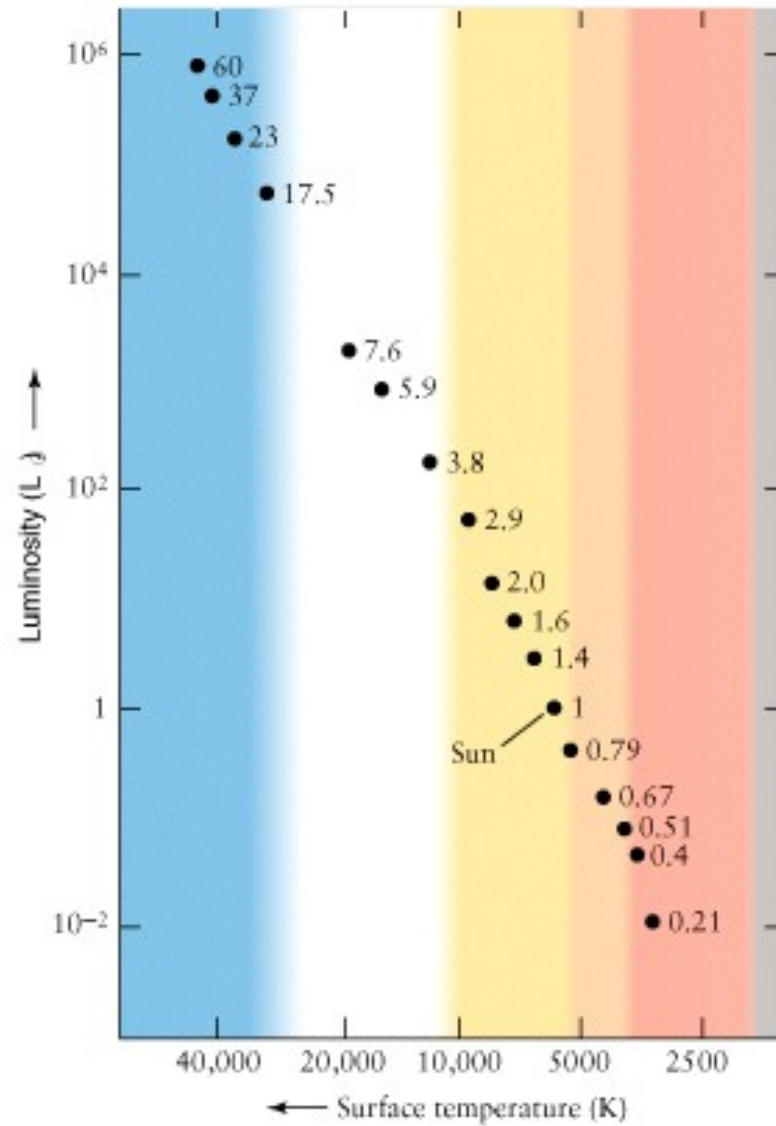
# Formación de Planetas Asociados a Todo Tipo de Estrellas

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Mercedes Gómez

Observatorio Astronómico de la  
Universidad Nacional de Córdoba

# Estrellas Normales



# Enanas Marrones



**SUN**

**Low-mass star**

**Brown Dwarf**

**Jupiter**

**Earth**

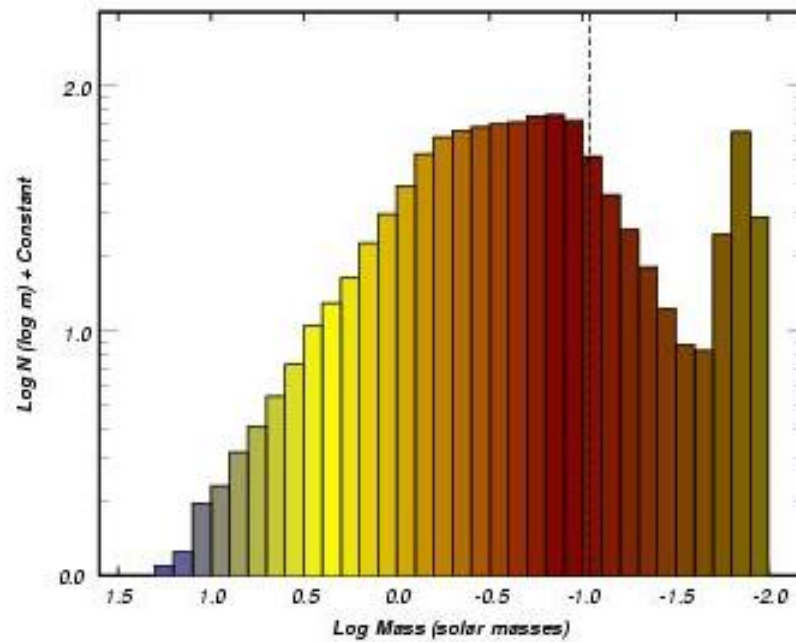


# Función Inicial de Masa

10

Charles J. Lada

*Trapezium Cluster Initial Mass Function*



# Regiones de Formación Estelar



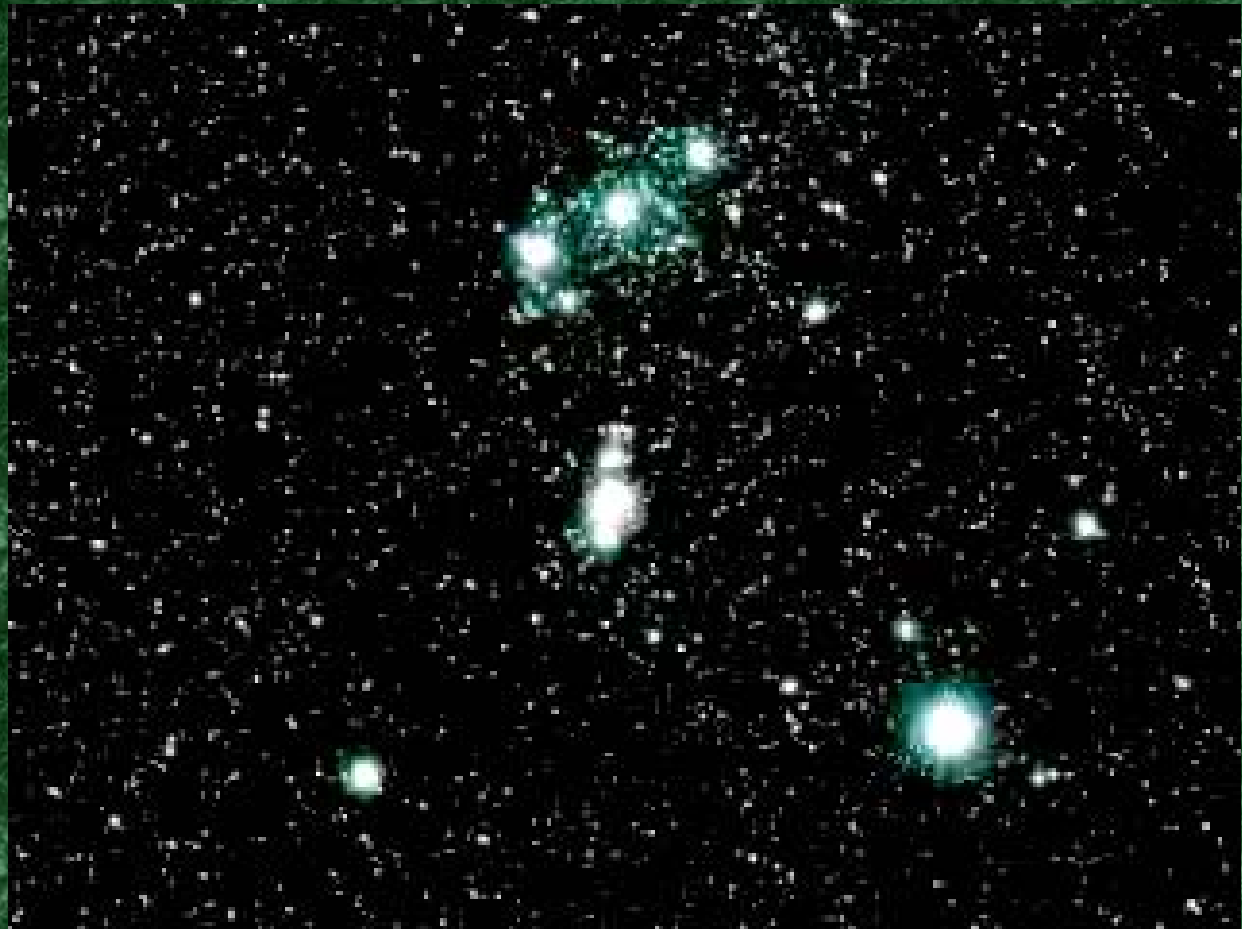
**Orion Nebula Mosaic**

**HST • WFPC2**

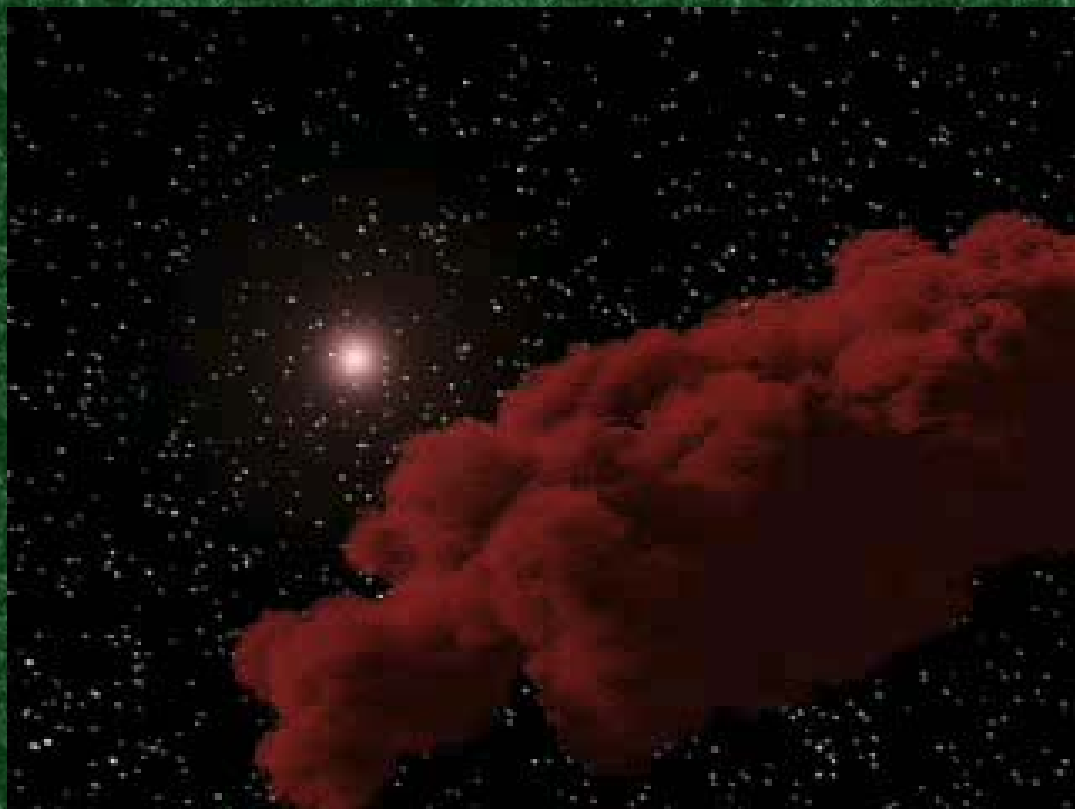
PRC95-45a • ST ScI OPO • November 20, 1995

C. R. O'Dell and S. K. Wong (Rice University), NASA

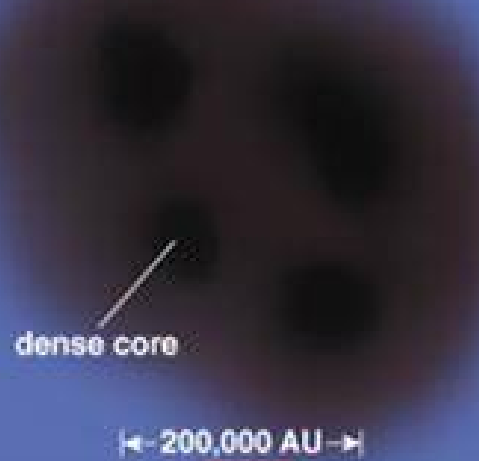








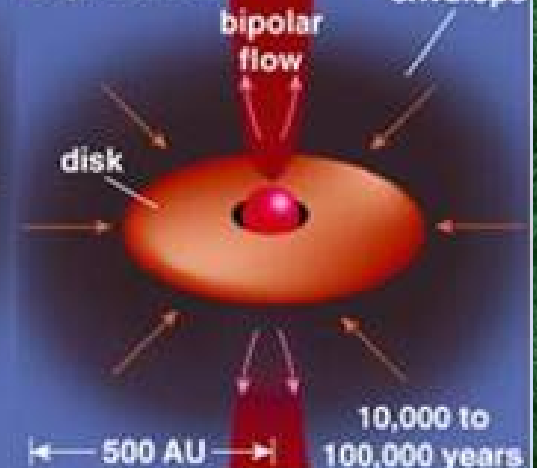
**a** dark cloud



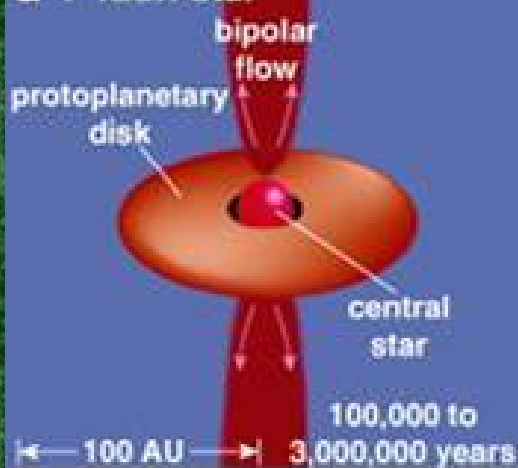
**b** gravitational collapse



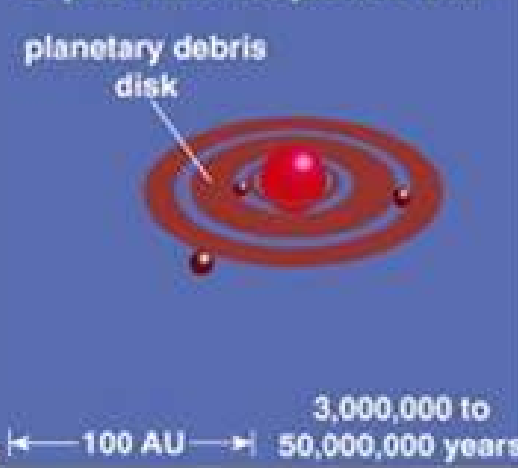
**c** protostar



**d** T Tauri star

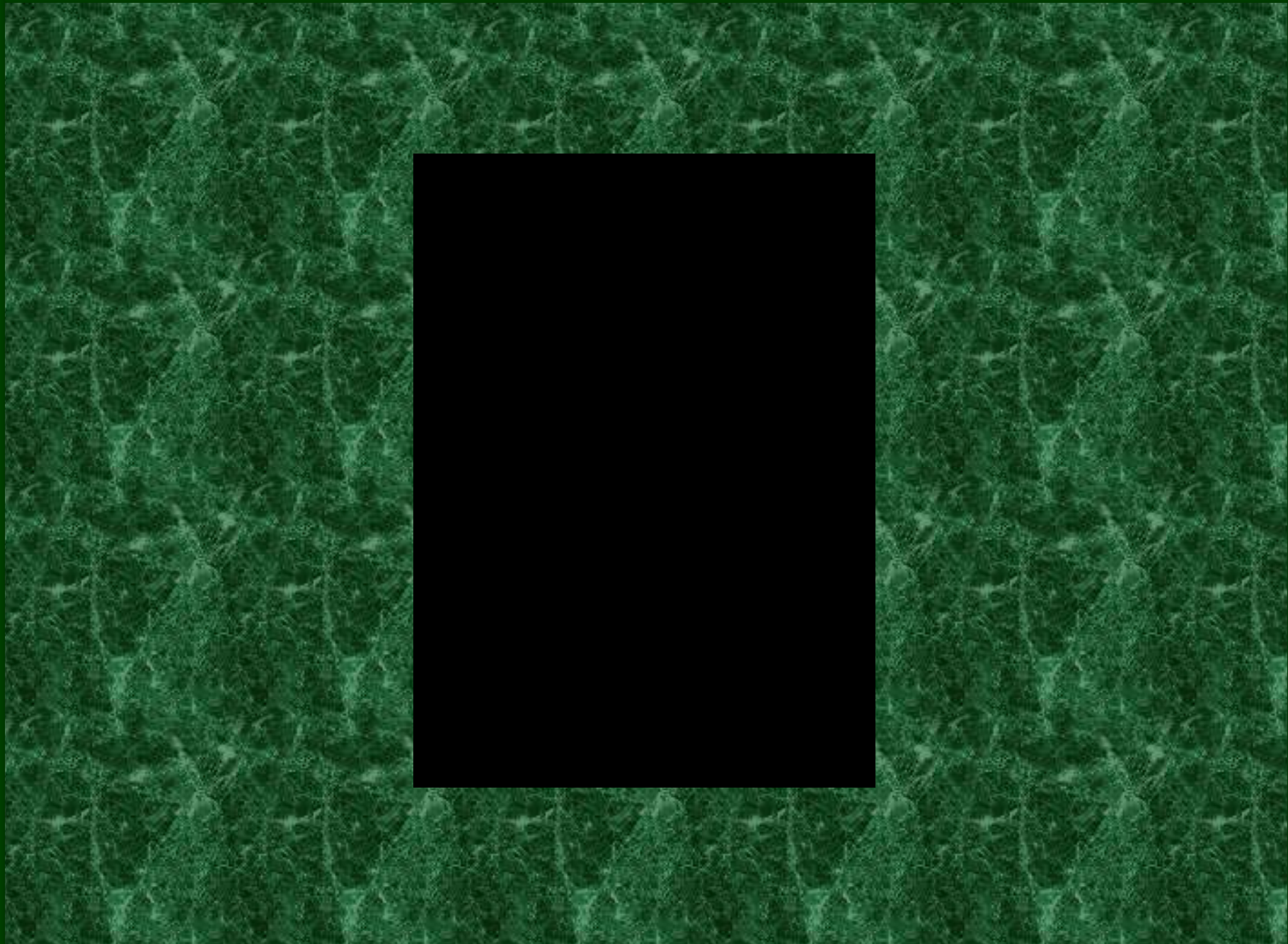


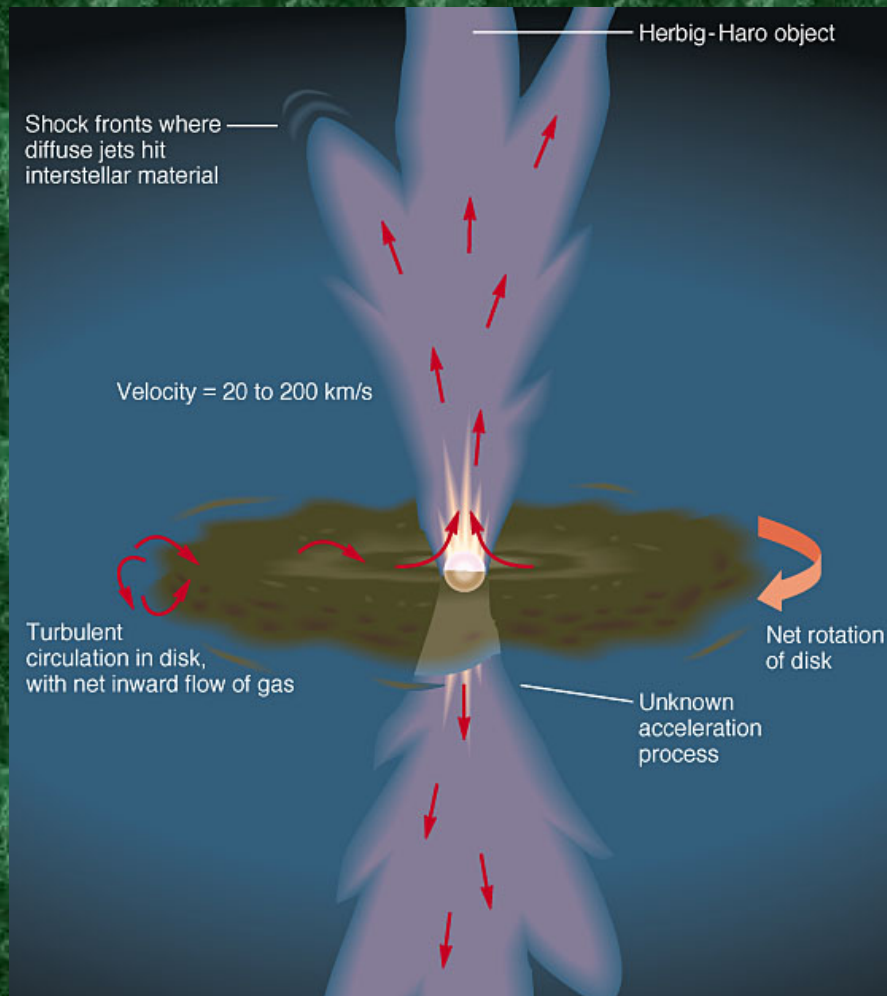
**e** pre-main-sequence star

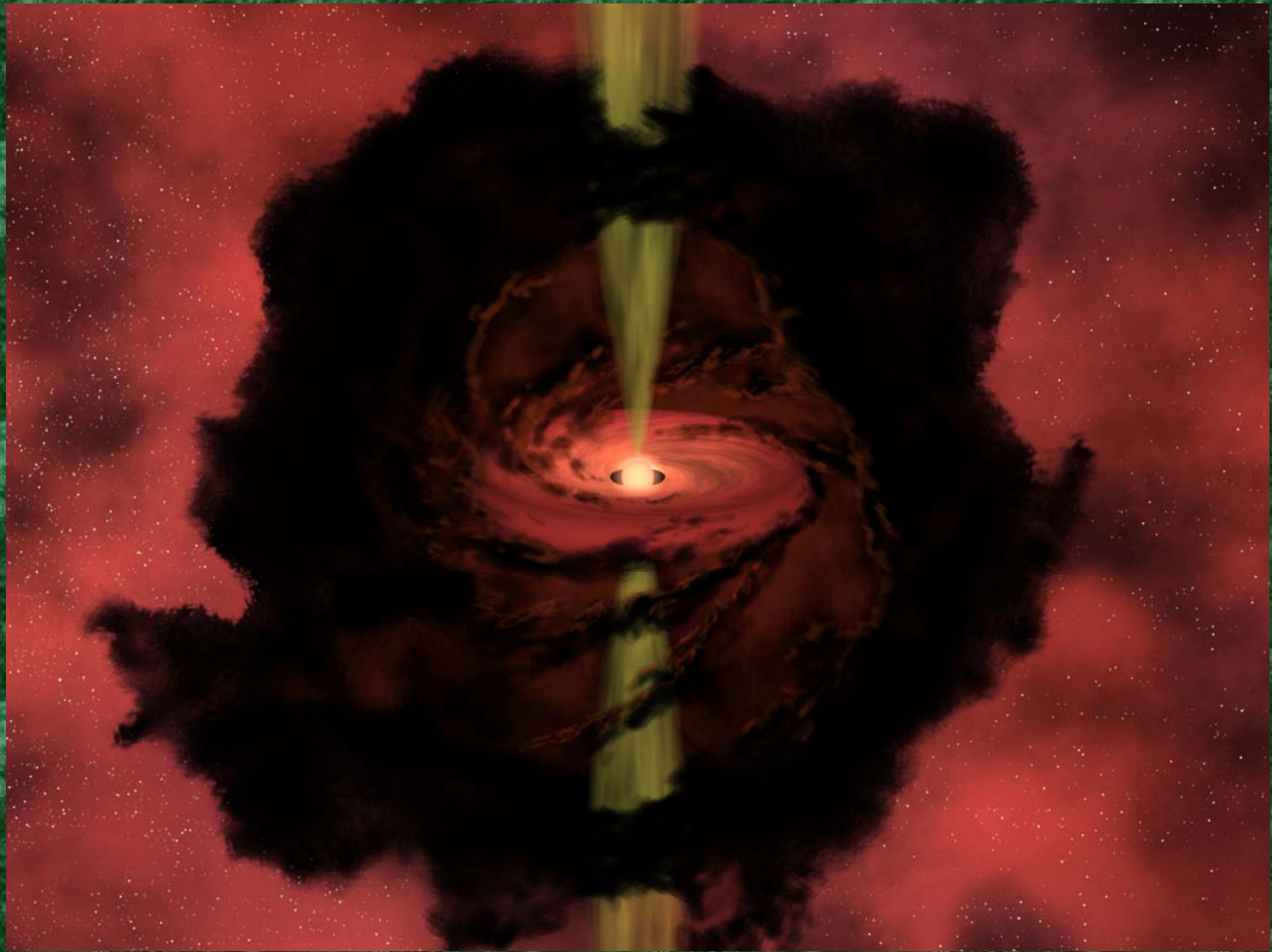


**f** young stellar system

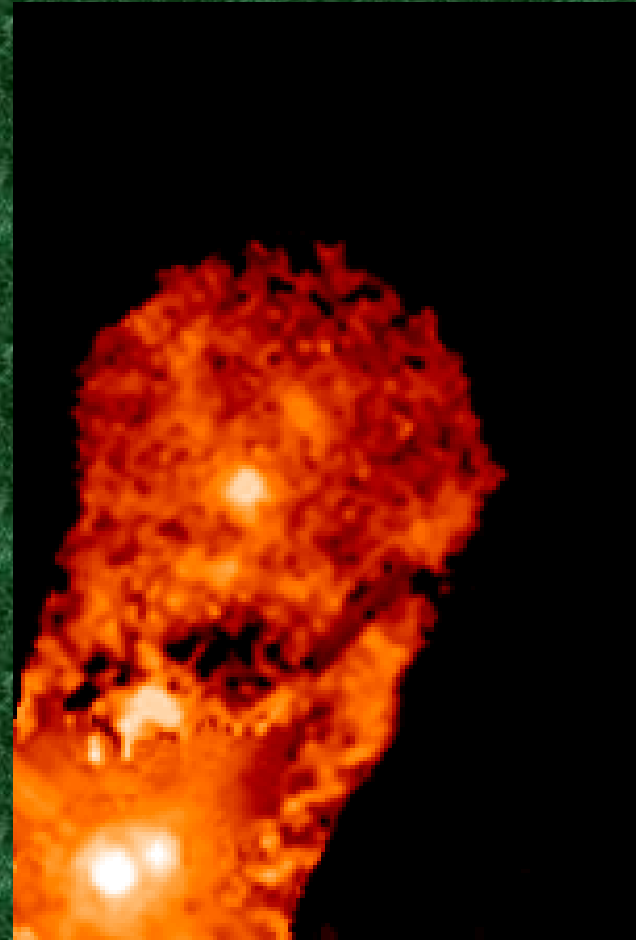
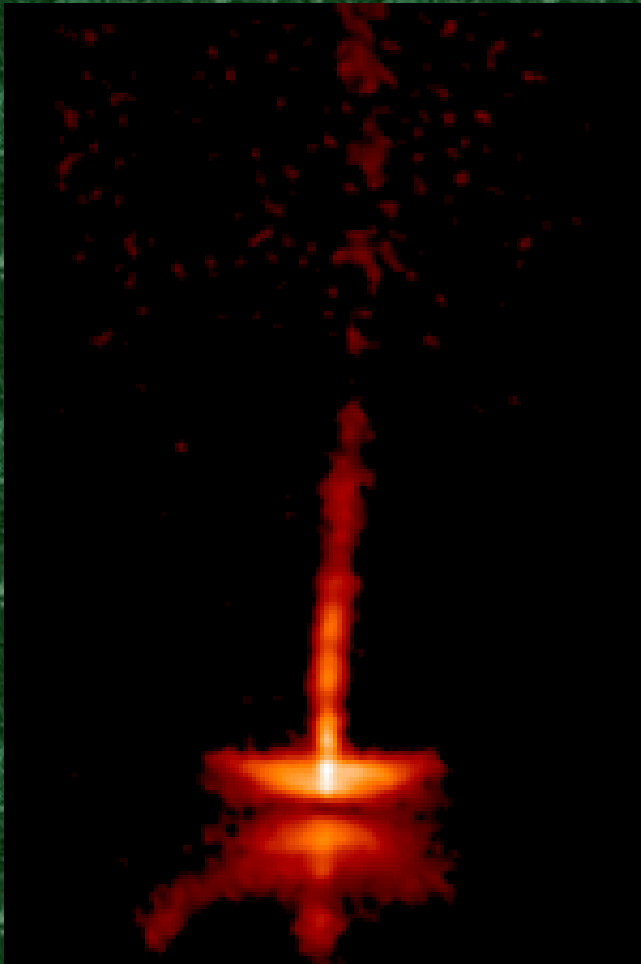


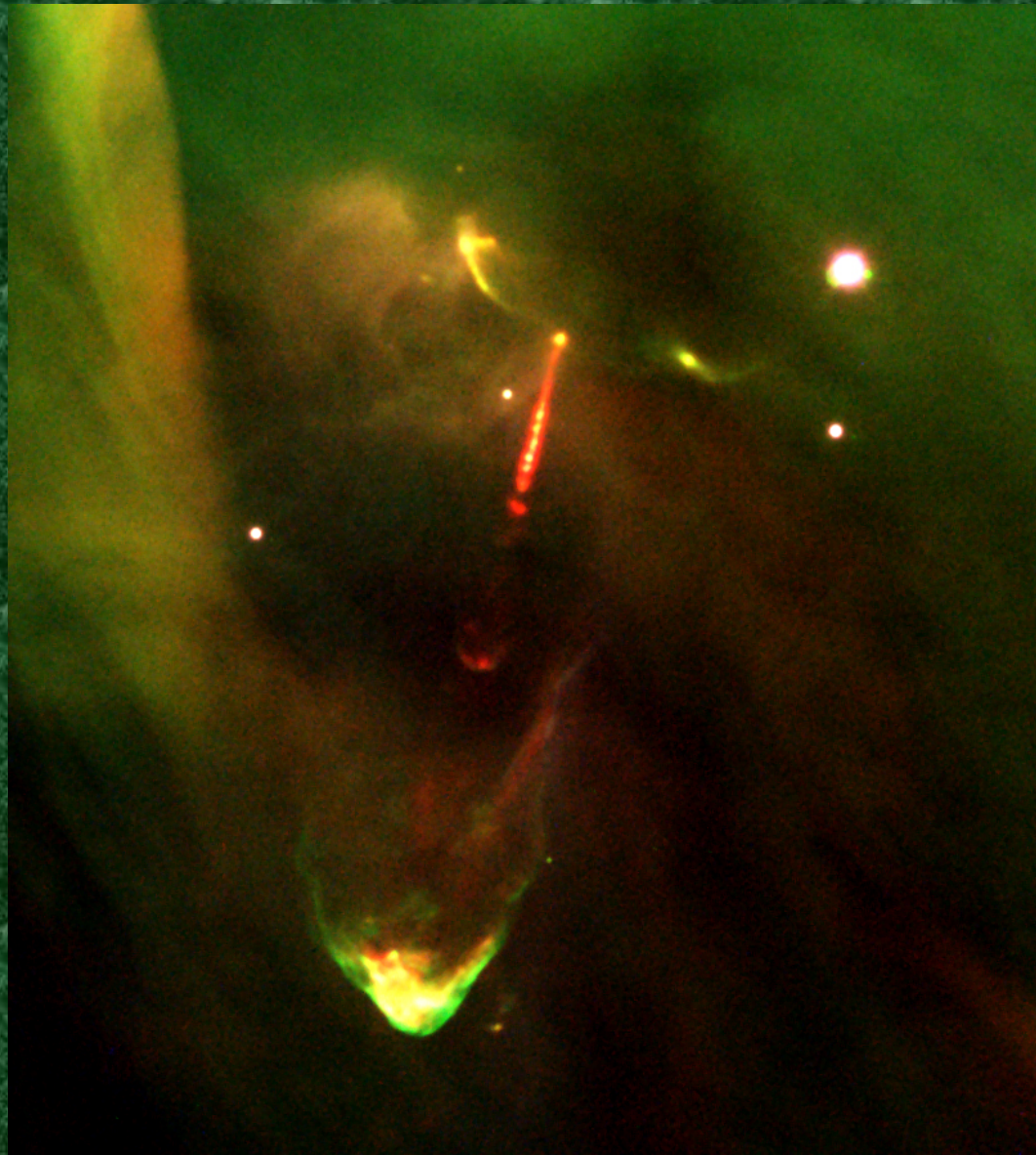


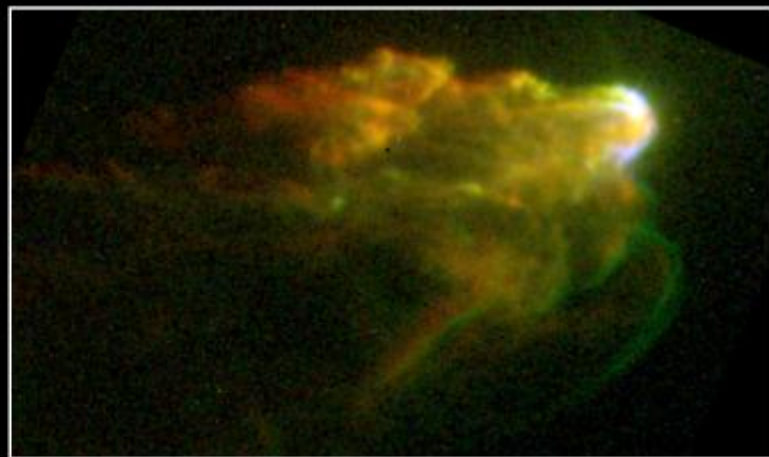
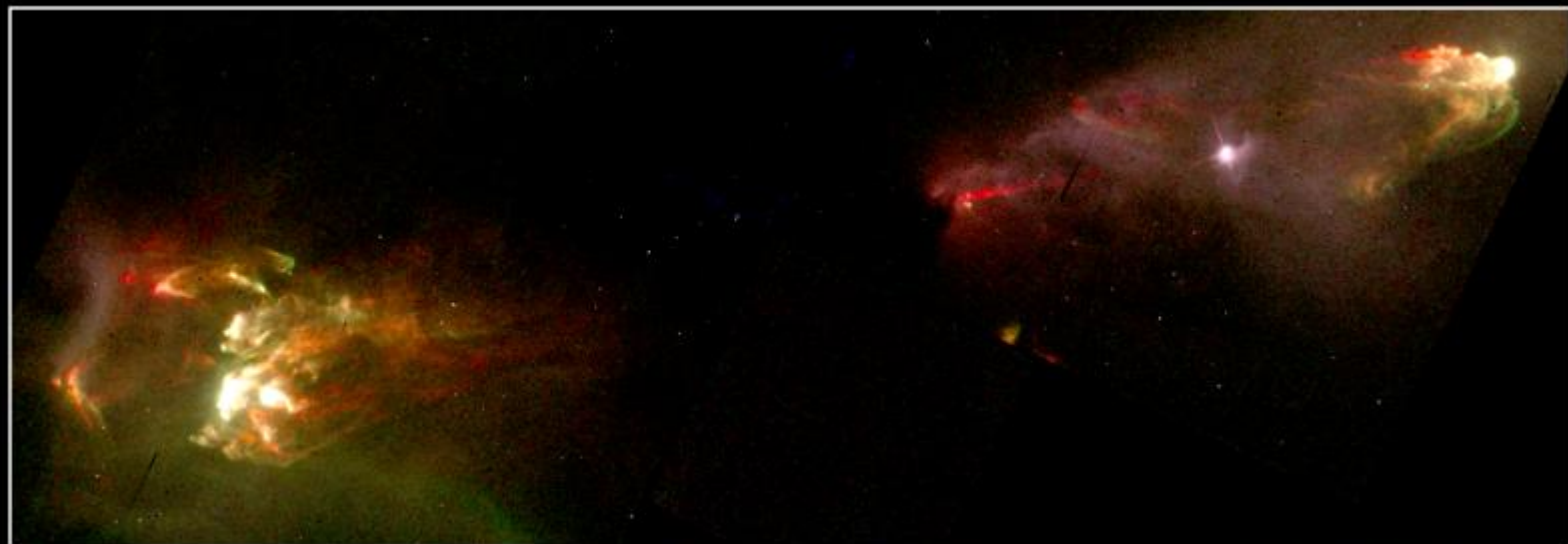




# Jets Estelares







**Jets from Young Stars · HH1/HH2**

**HST · WFPC2**

PRC95-24c · ST ScI OPO · June 6, 1995 · J. Hester (AZ State U.), NASA

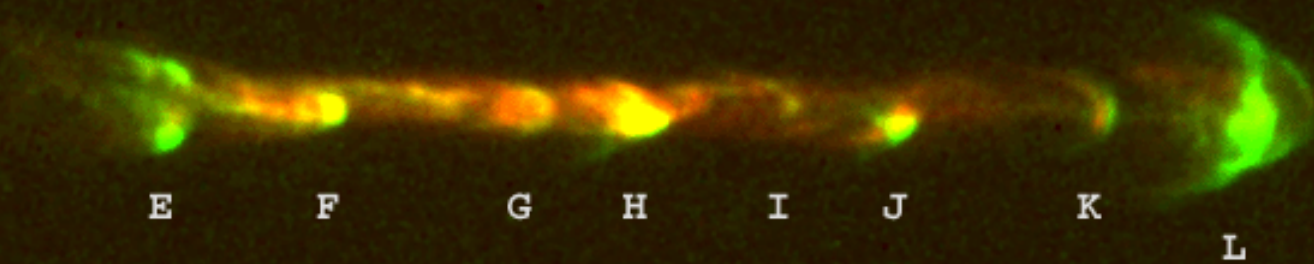


HH 111

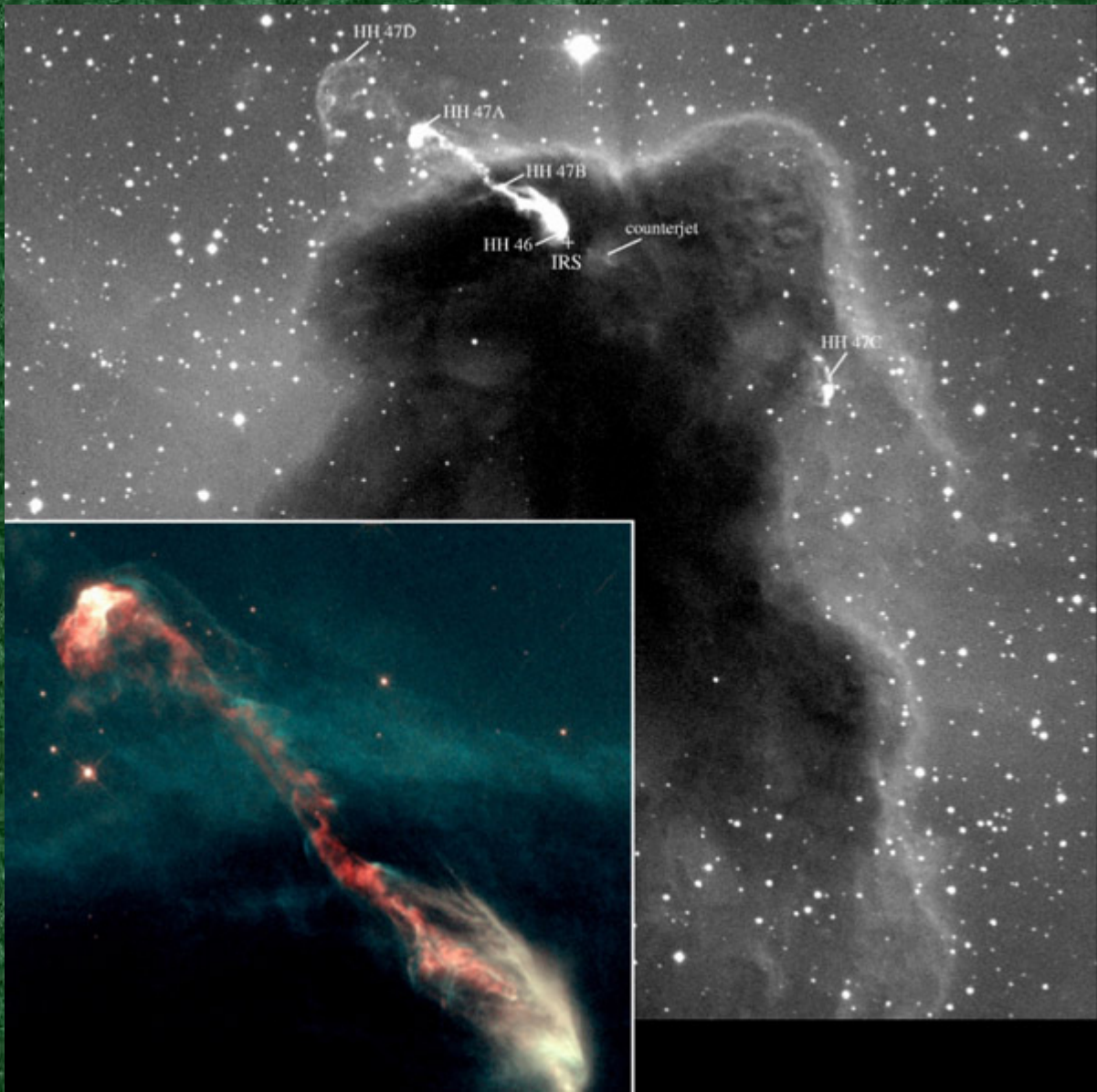
1994.9 UT

Green:  $H\alpha$

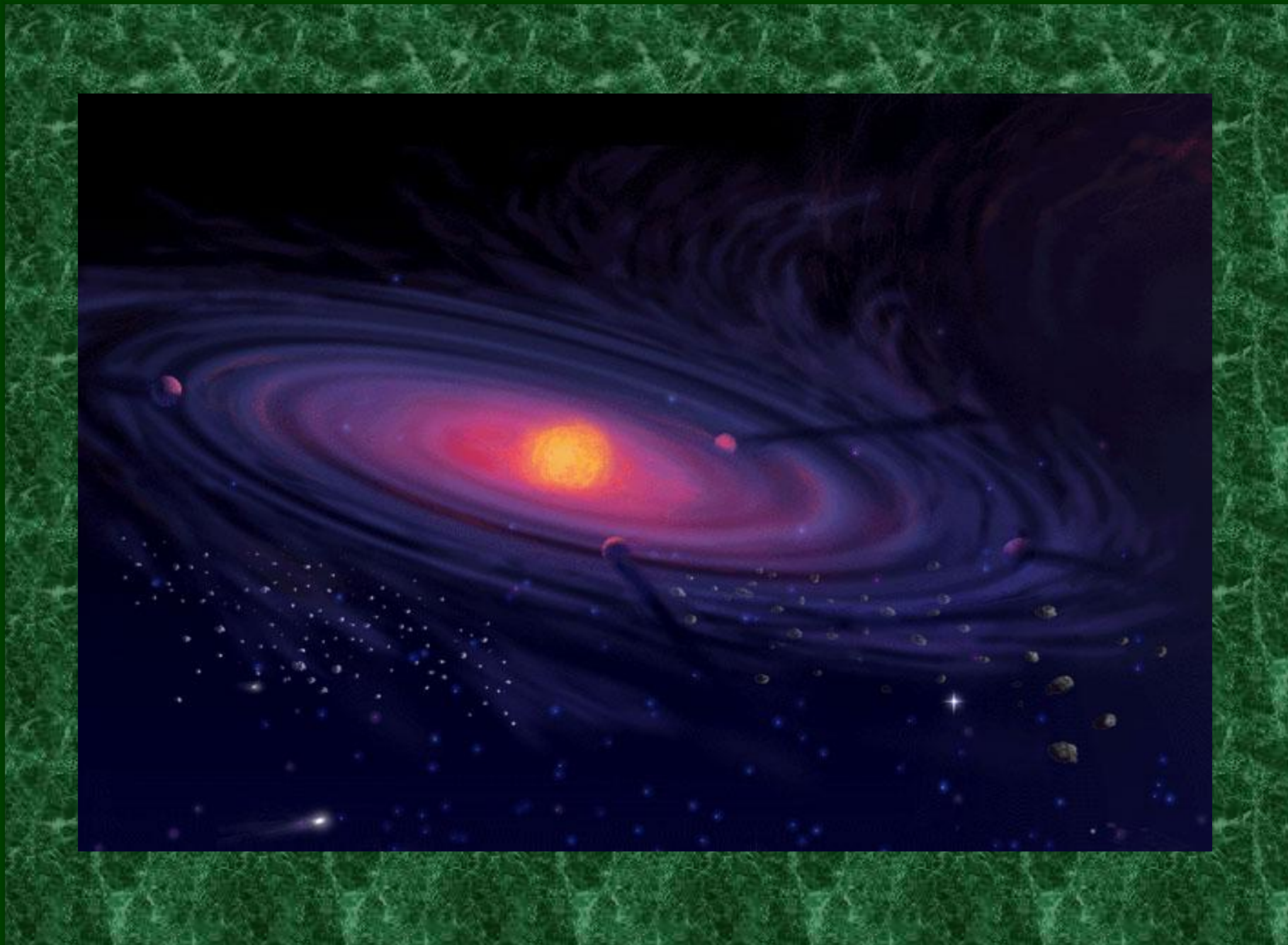
Red: [S II]



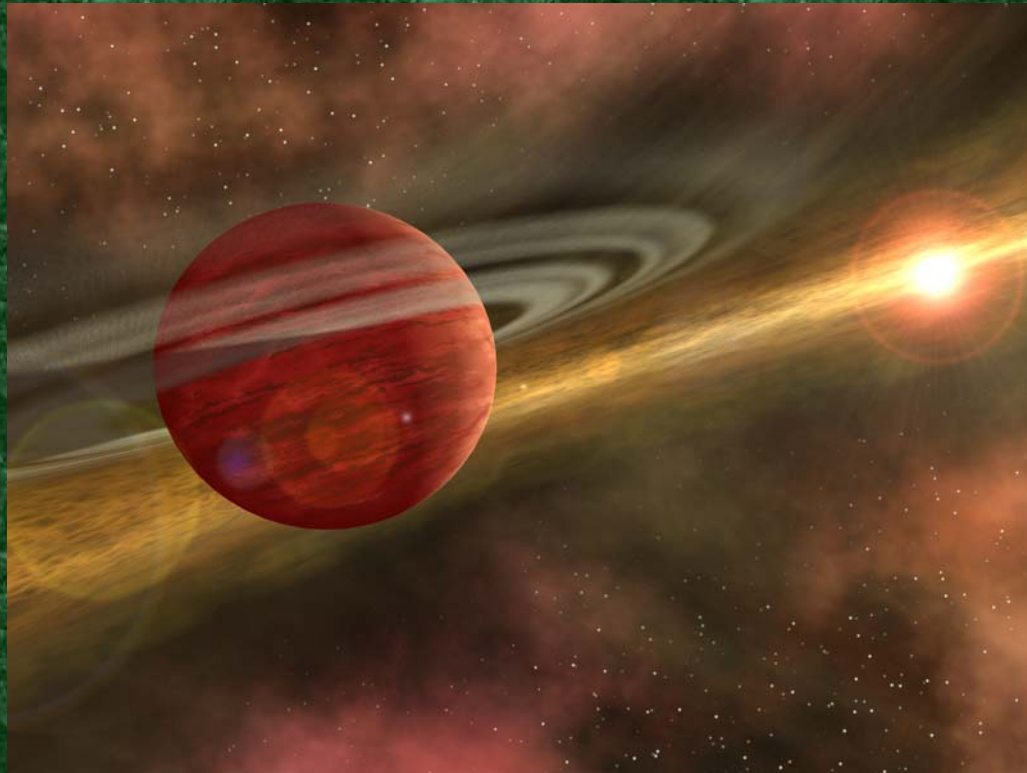
1000 AU

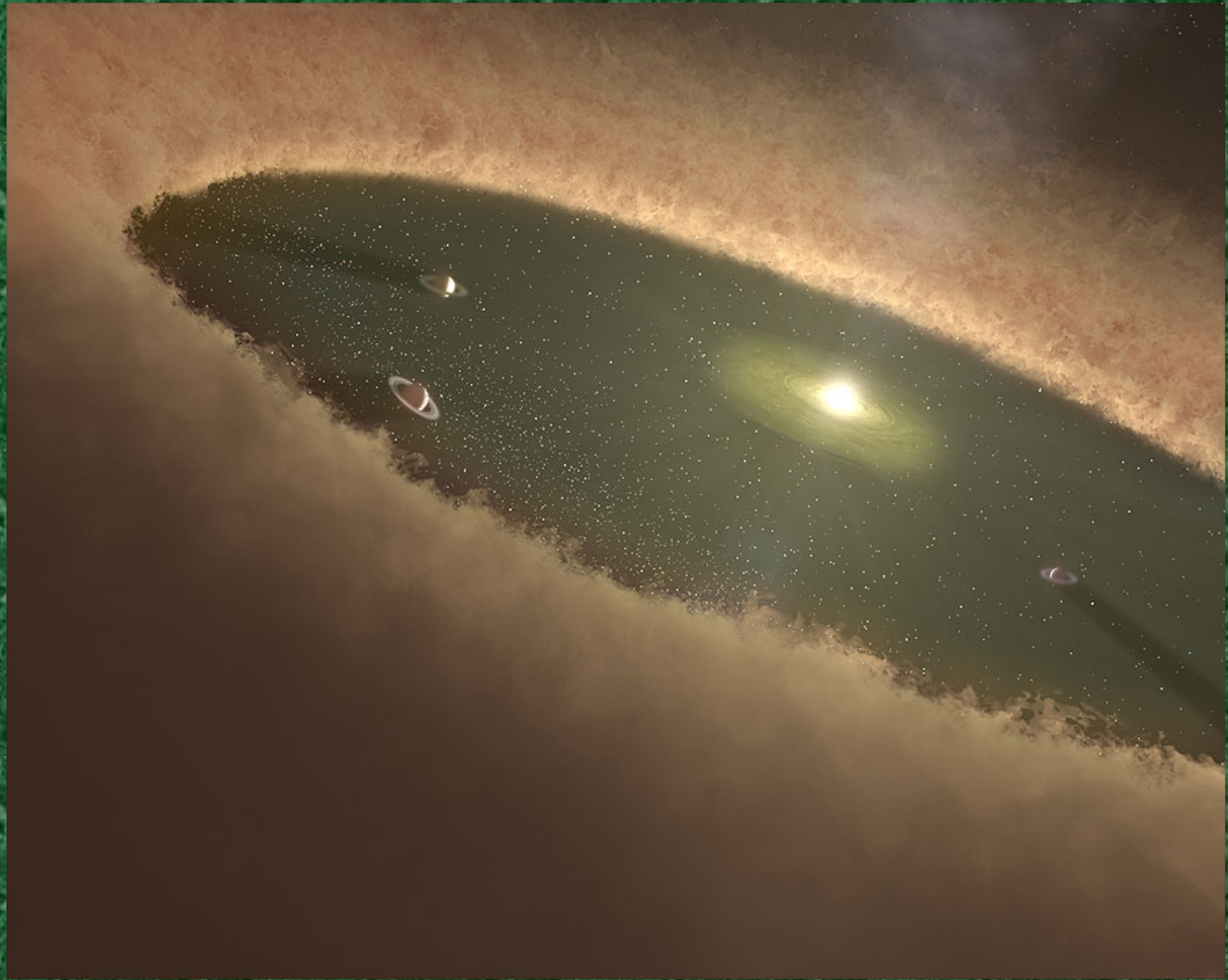










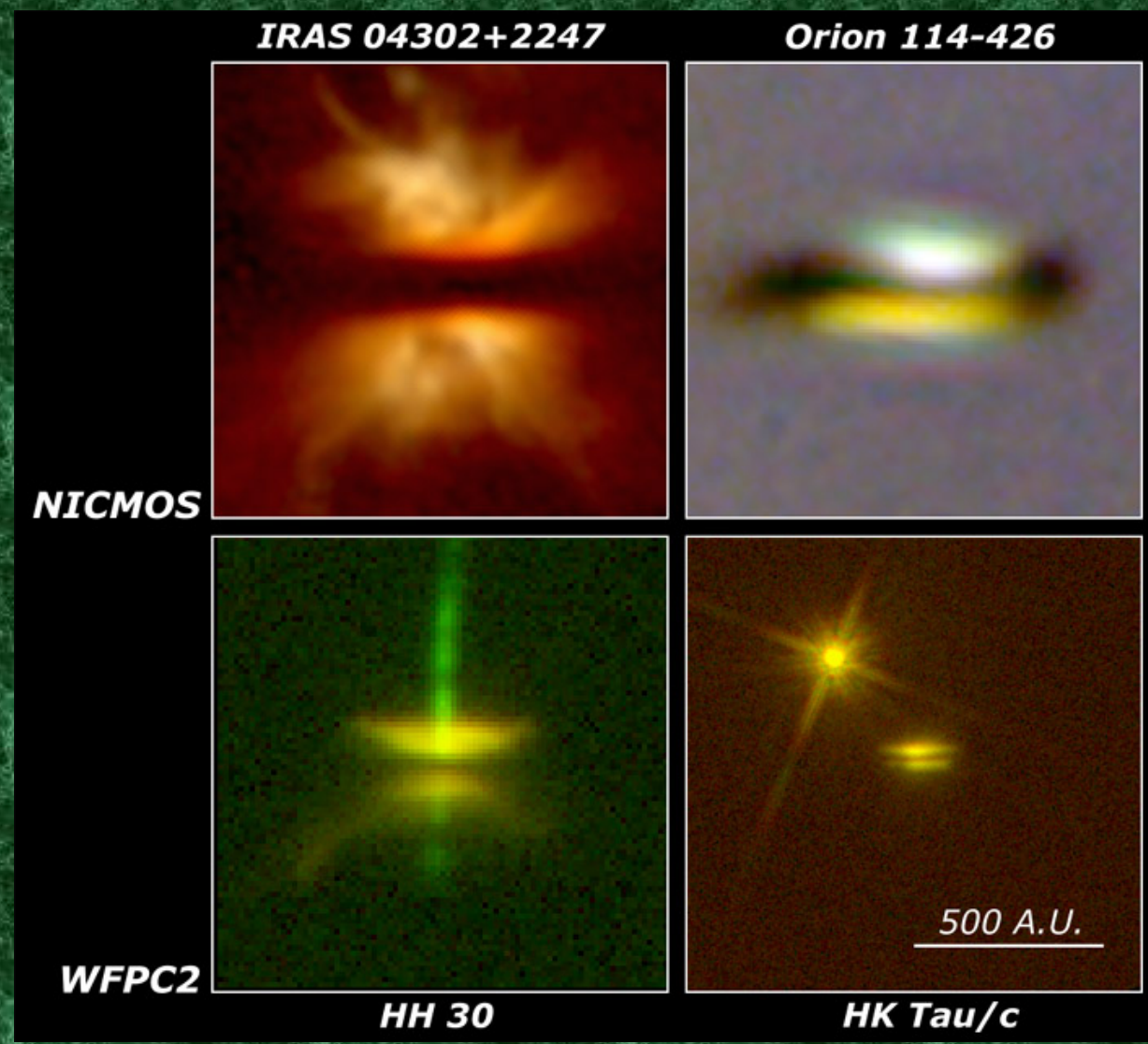


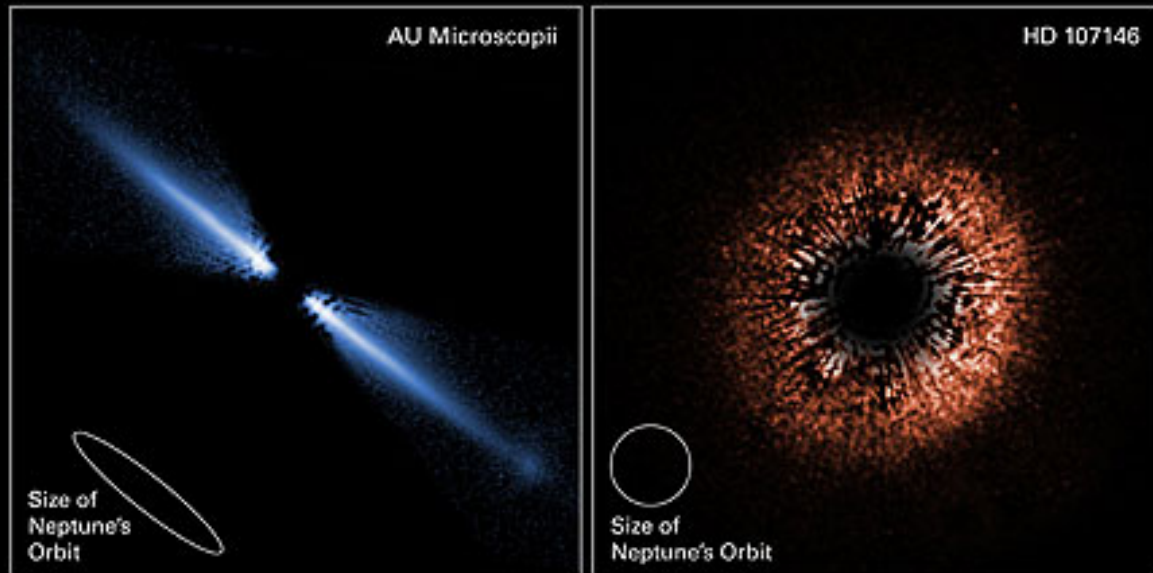






# Estrellas Jóvenes de Masa Solar

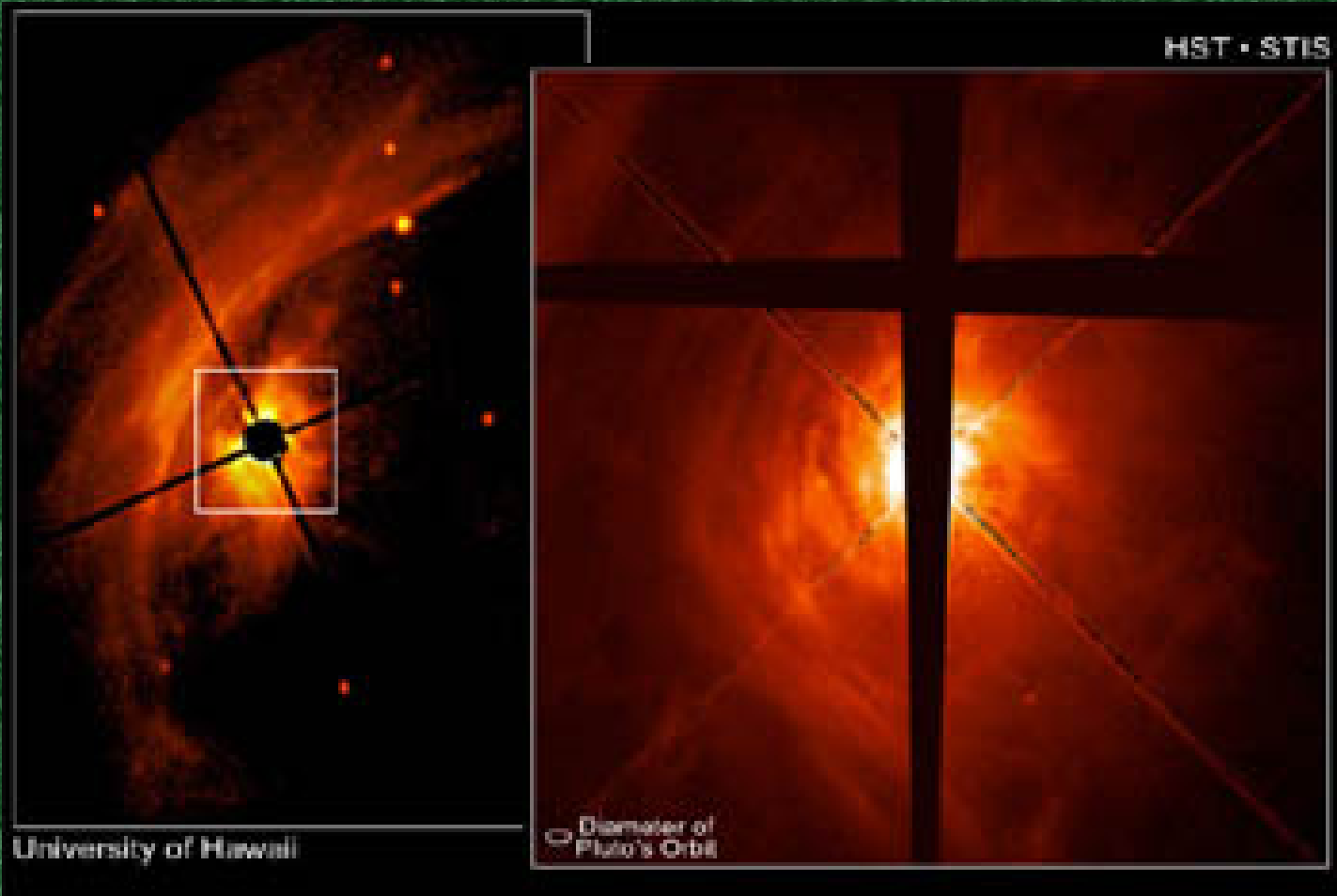


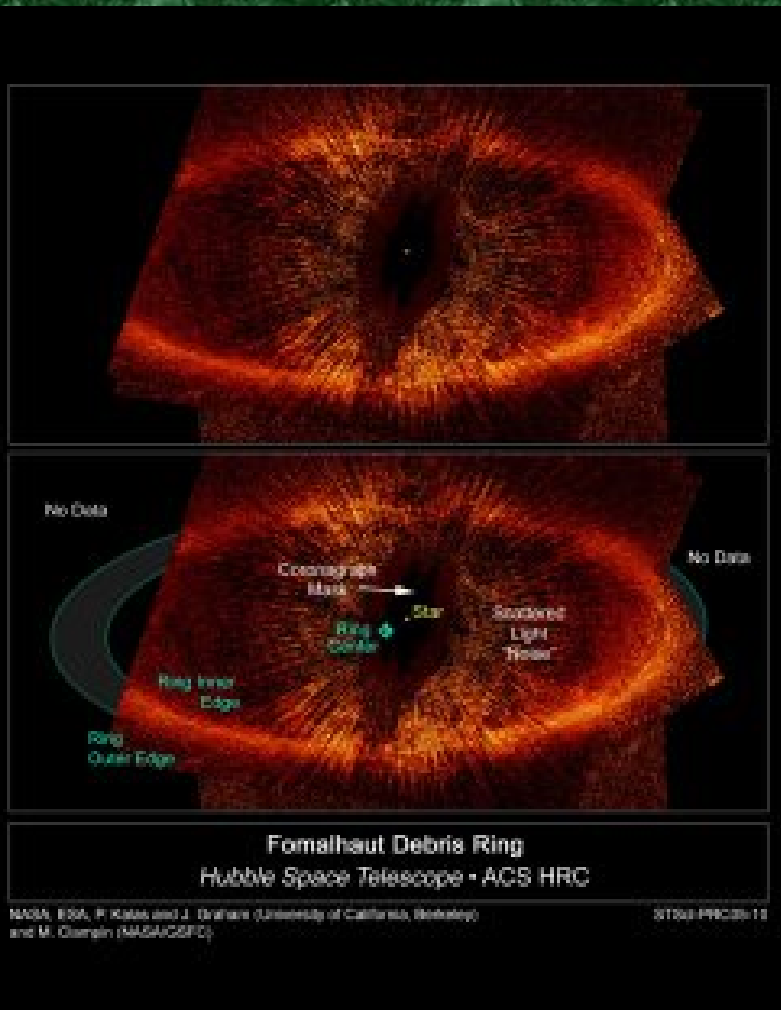


**Circumstellar Debris Disks**  
**Hubble Space Telescope • ACS HRC**

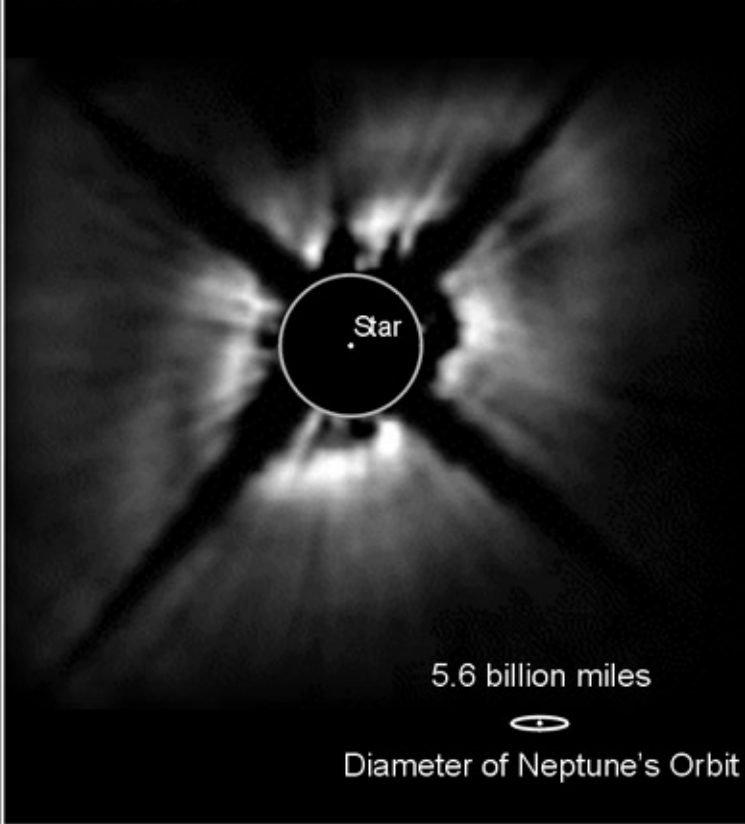
NASA, ESA, J. Krist (STScI/JPL), D.R. Ardila (JHU), D.A. Golimowski (JHU), M. Clampin (NASA/Goddard),  
H. Ford (JHU), G. Hartig (STScI), G. Illingworth (UCO-Lick) and the ACS Science Team

STScI-PRC04-33a

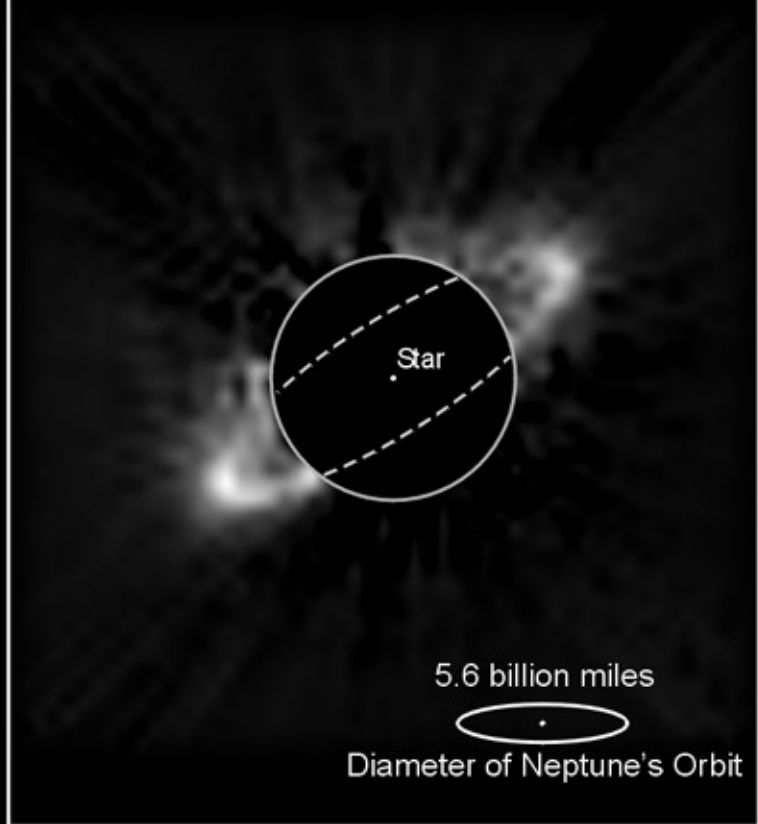




HD 141569



HR 4796A



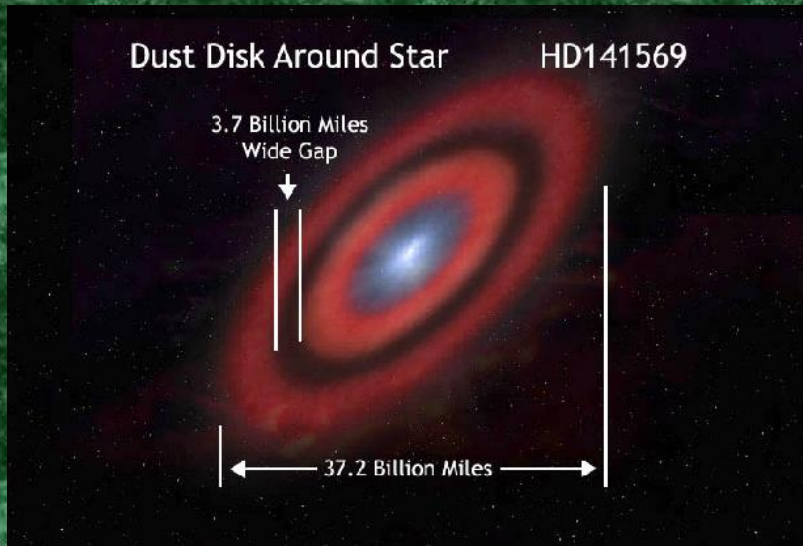
### Dust Disks around Stars

HST • NICMOS

PRC99-03 • STScI OPO • January 8, 1999

B. Smith (University of Hawaii), G. Schneider (University of Arizona),

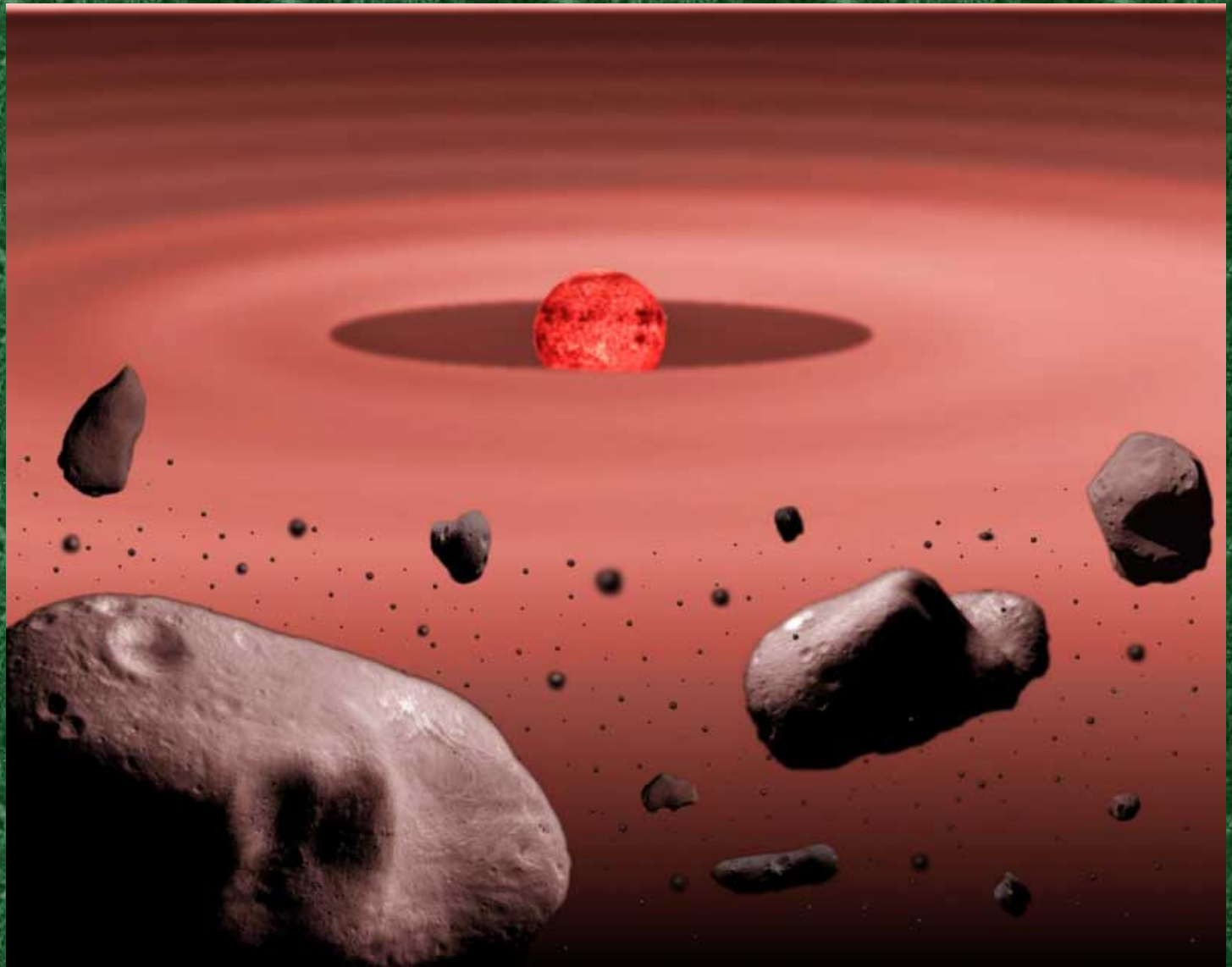
E. Becklin and A. Weinberger (UCLA) and NASA

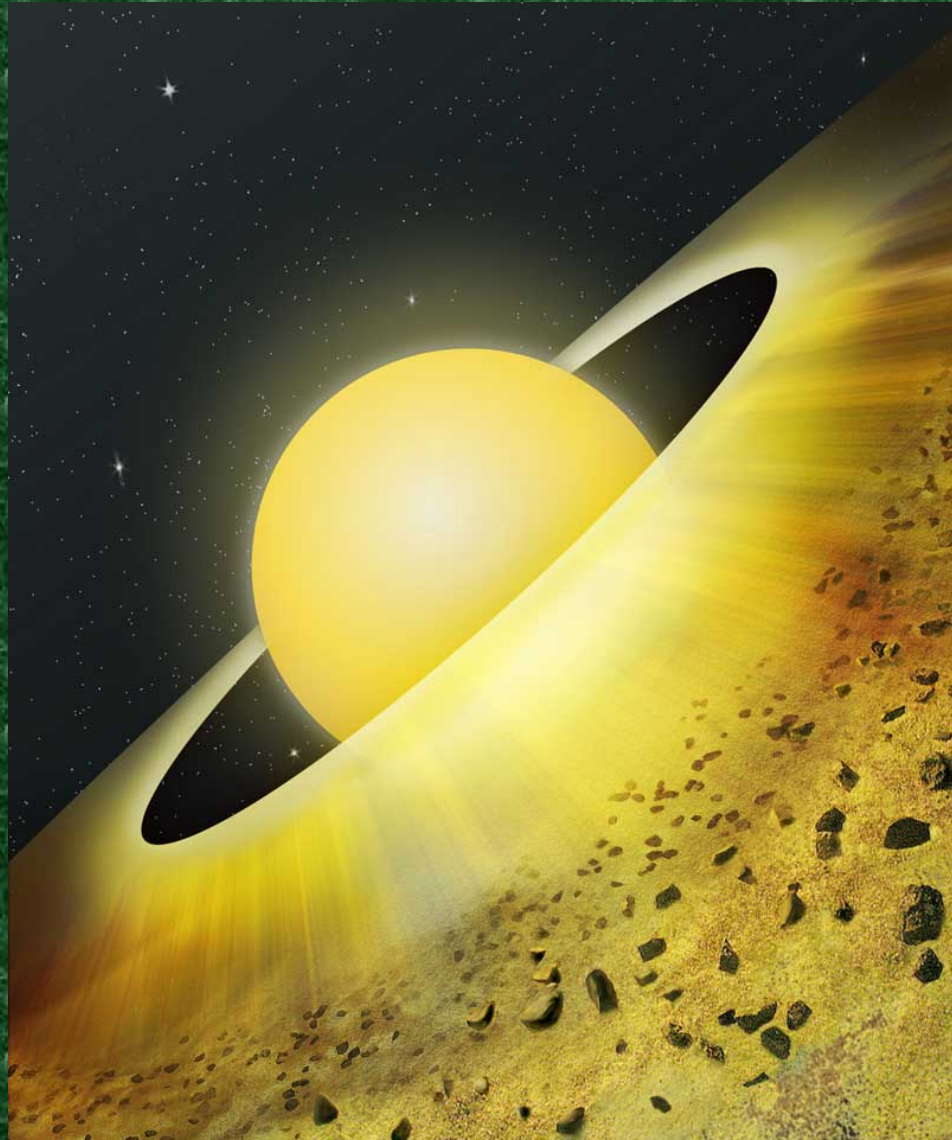


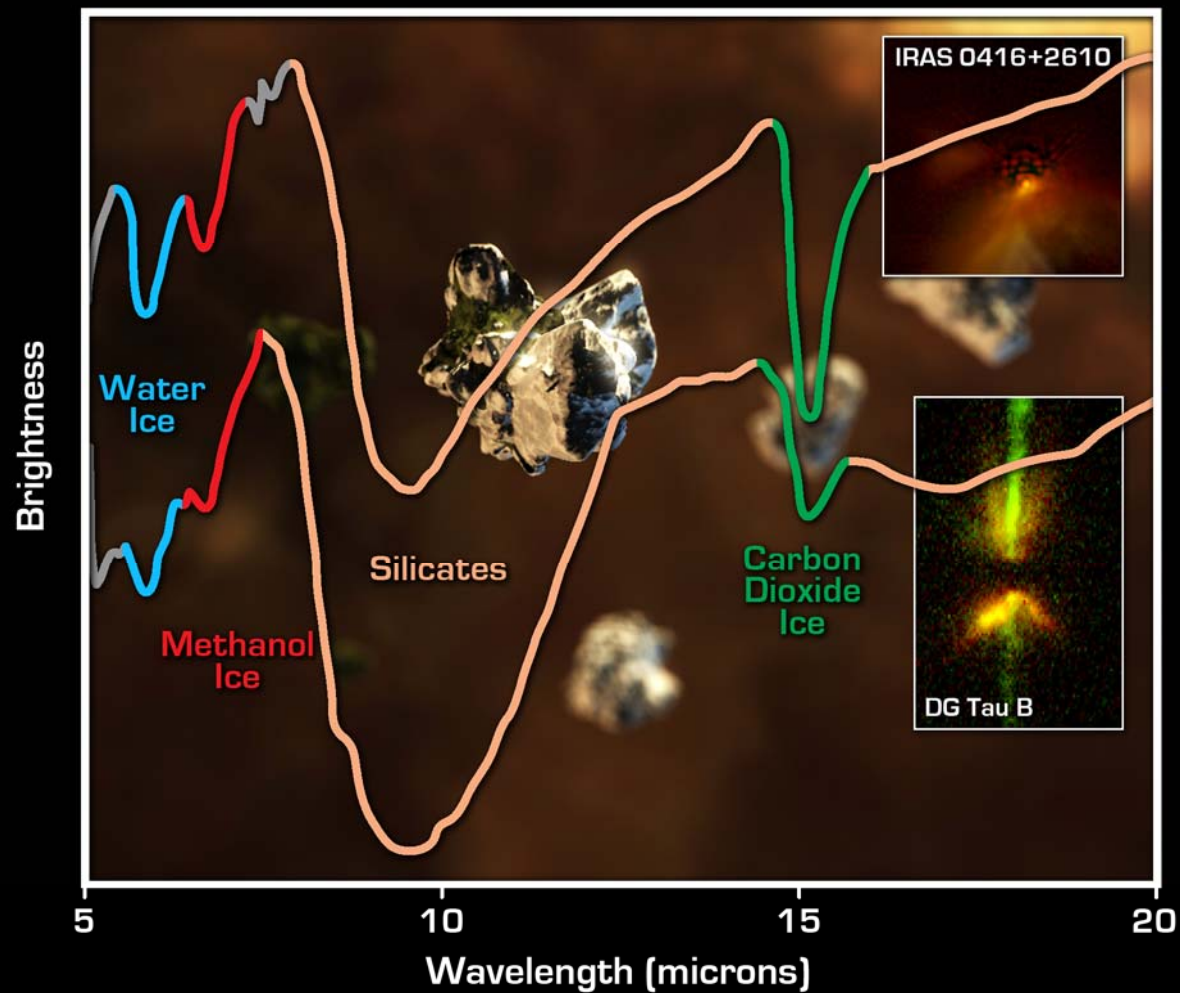












## Ices in Protoplanetary Disks

Spitzer Space Telescope • IRS

NASA / JPL-Caltech / D. Watson (University of Rochester)

left insets: Hubble Space Telescope; backdrop: artist's depiction  
ssc2004-08b



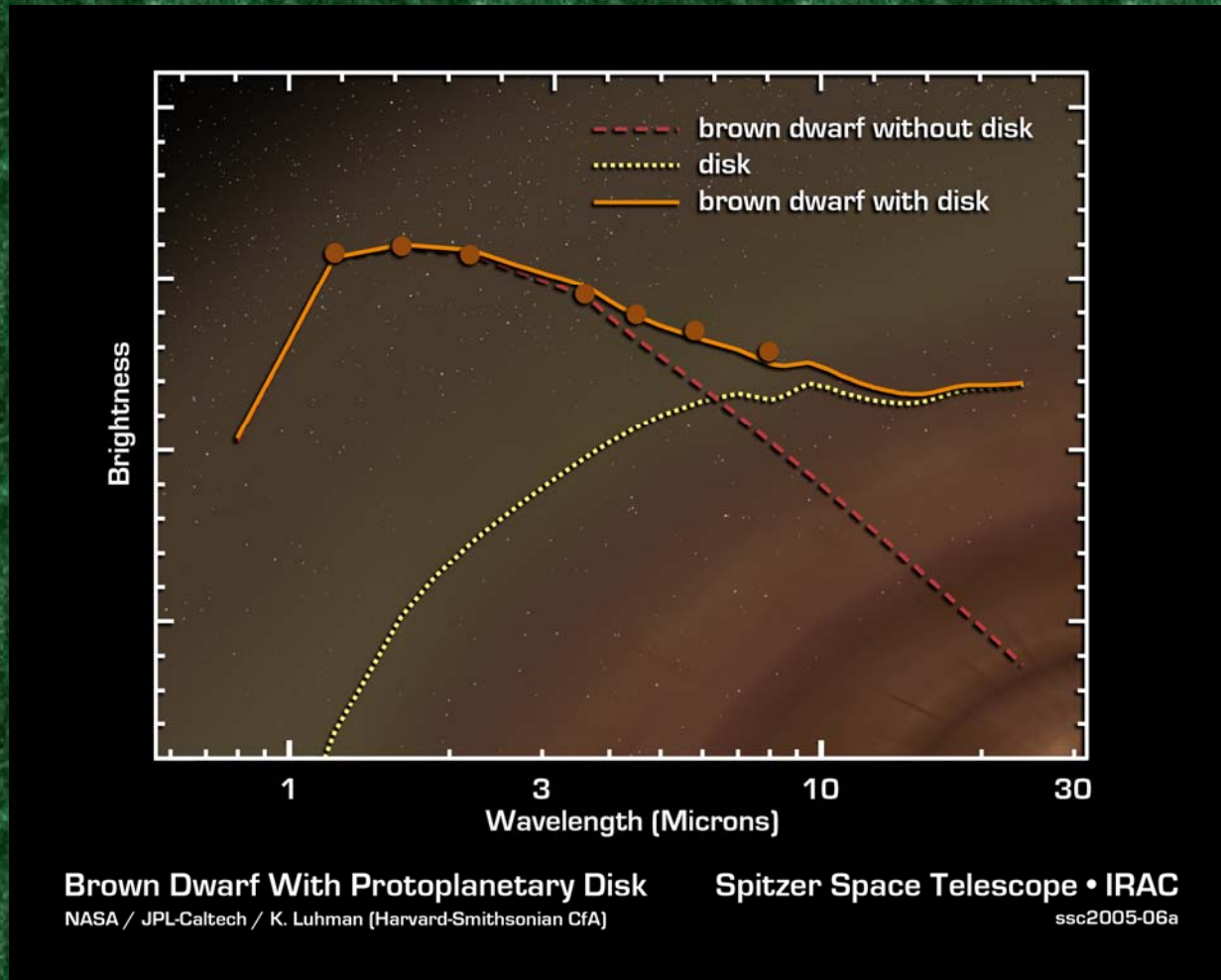


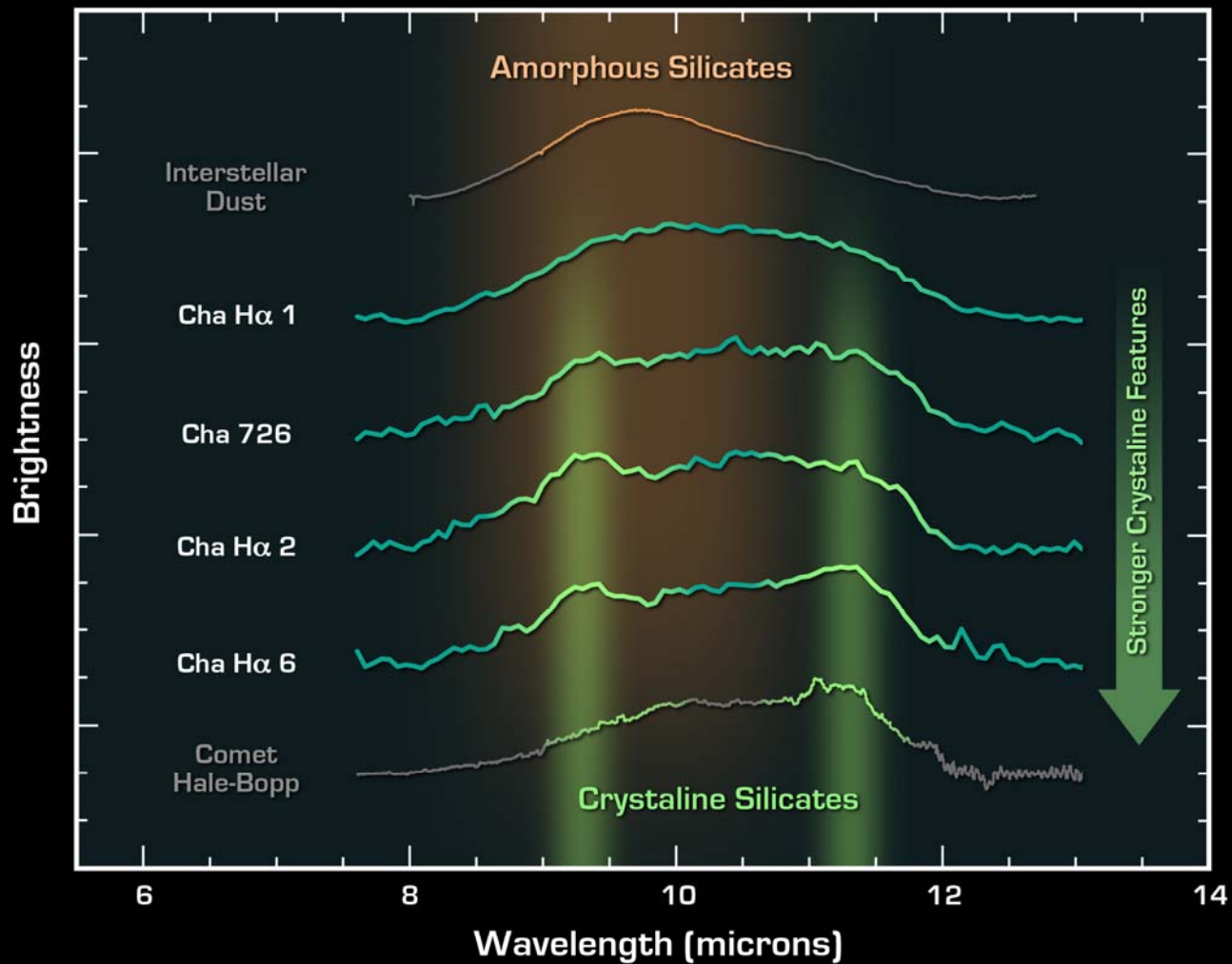






# Las Enanas Marrones Jóvenes también tienen discos!





**Crystalline Dust in Brown Dwarf Disks**

NASA / JPL-Caltech / D. Apai (University of Arizona)

**Spitzer Space Telescope • IRS**

ssc2005-21a



2MASSWJ1207334-393254

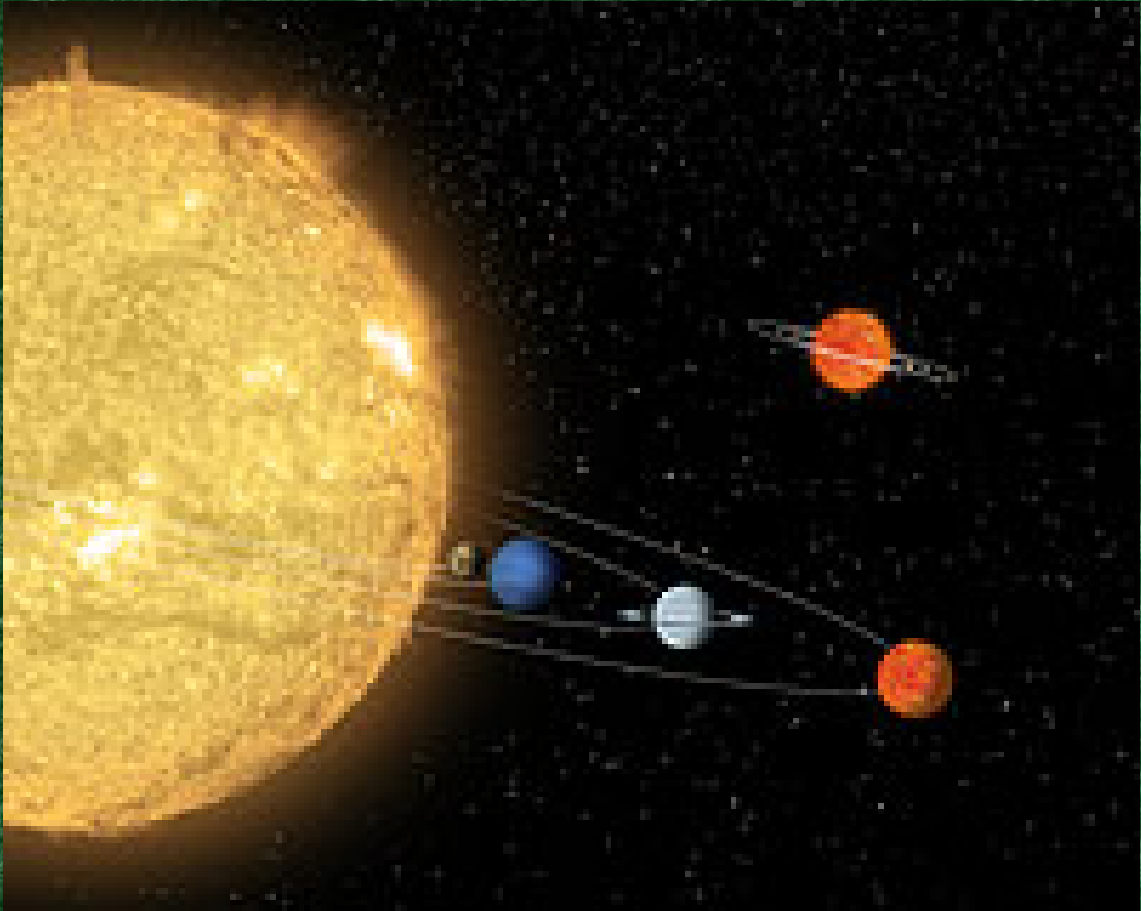


NACO Image of the Brown Dwarf Object 2M1207 and GPCC

ESO PR Photo 26a/04 (10 September 2004)

© European Southern Observatory





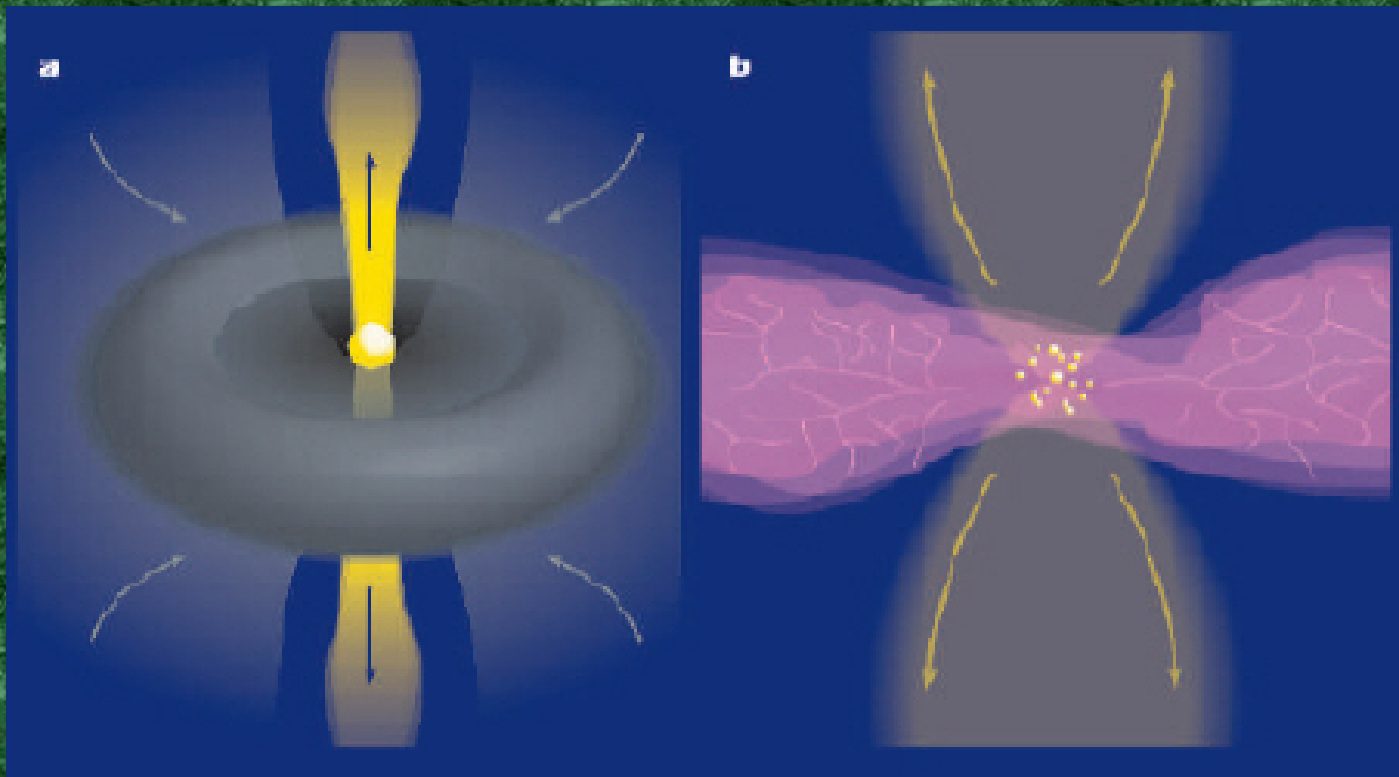
# Estrellas Jóvenes de Gran Masa



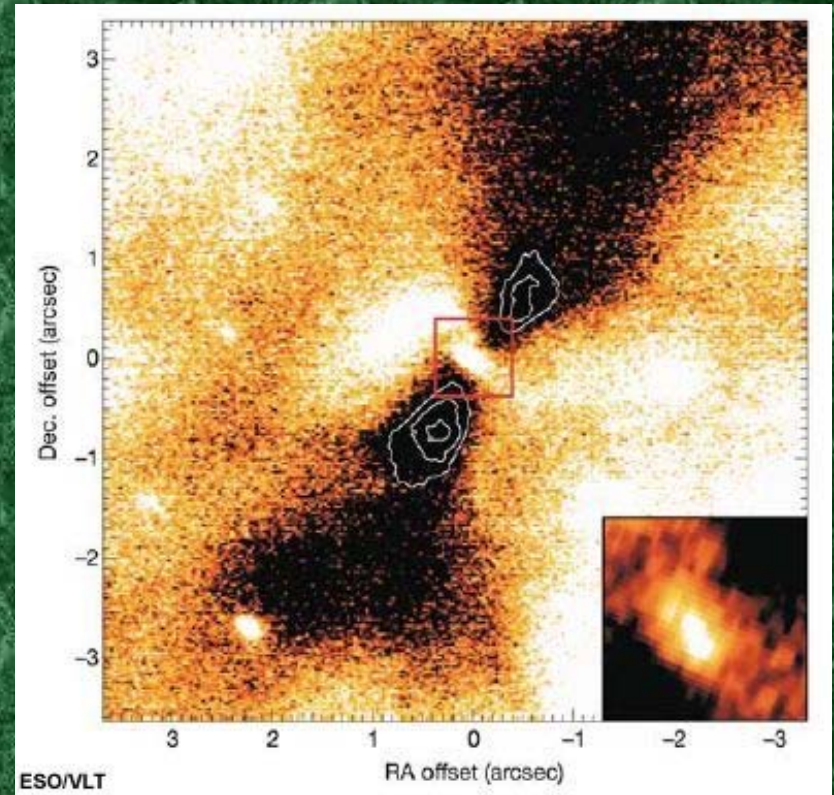
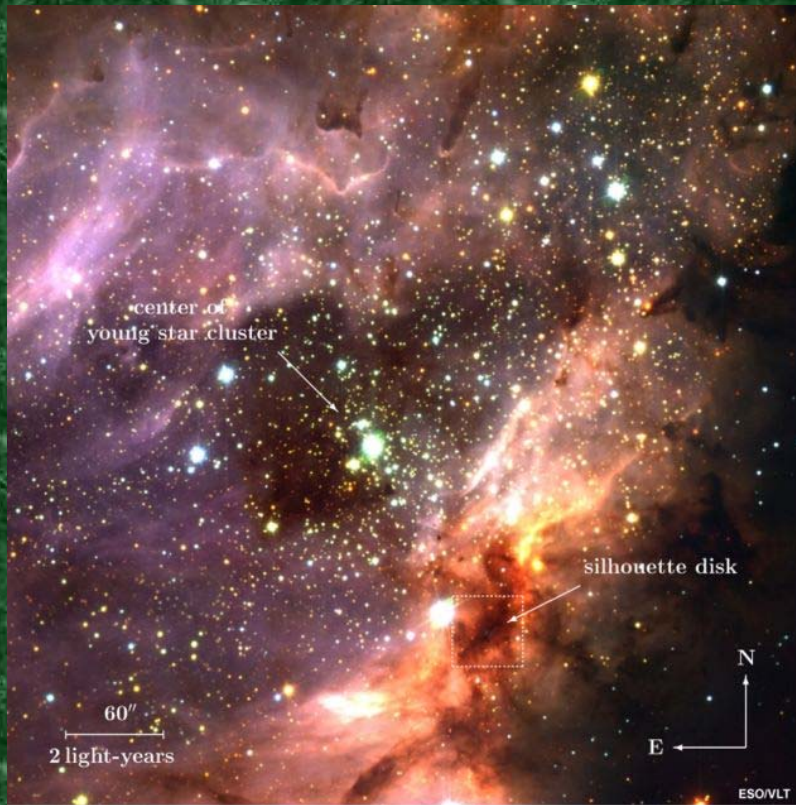




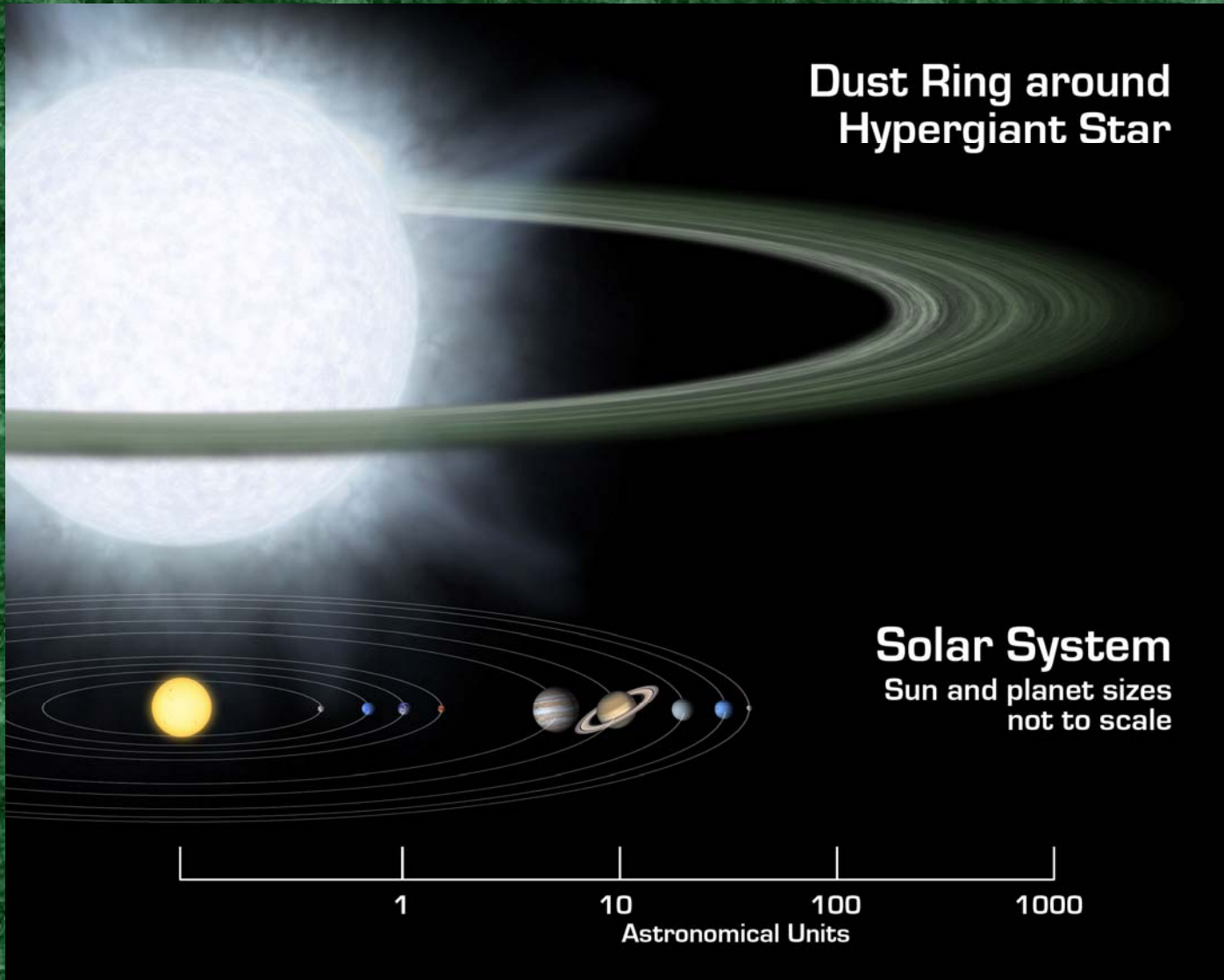




## Discos en Estrellas de Gran Masa



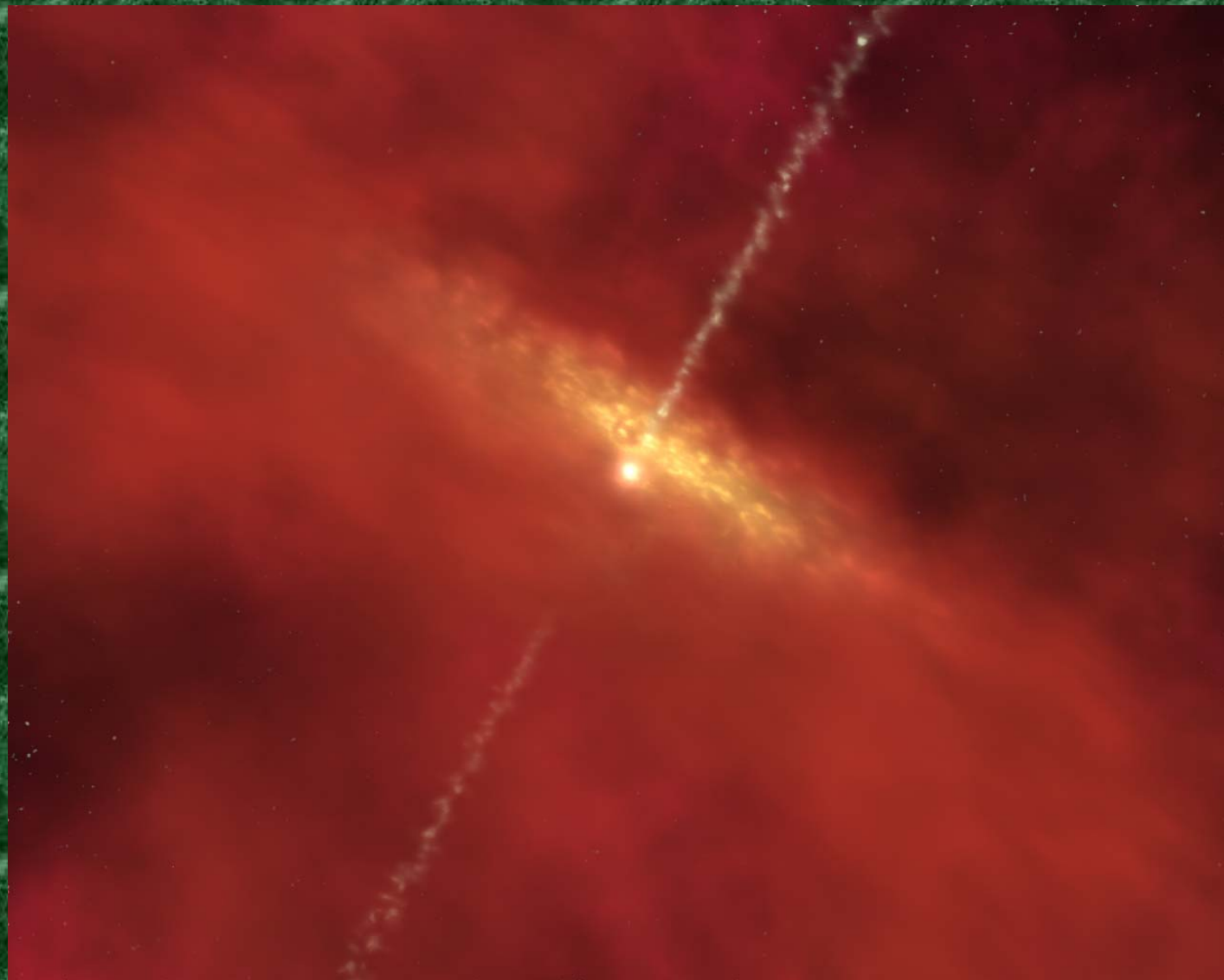
**Dust Ring around  
Hypergiant Star**

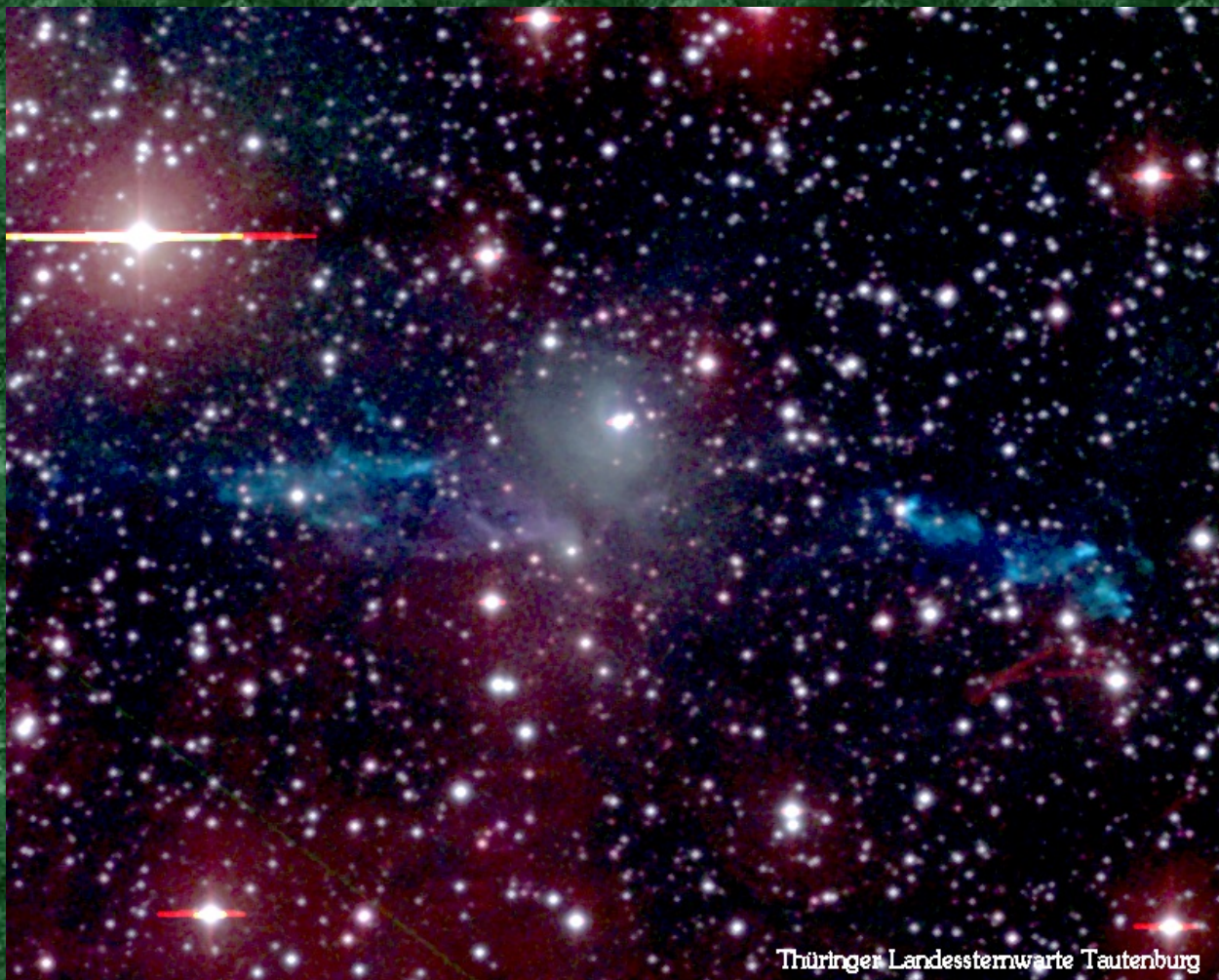


**Solar System**  
Sun and planet sizes  
not to scale

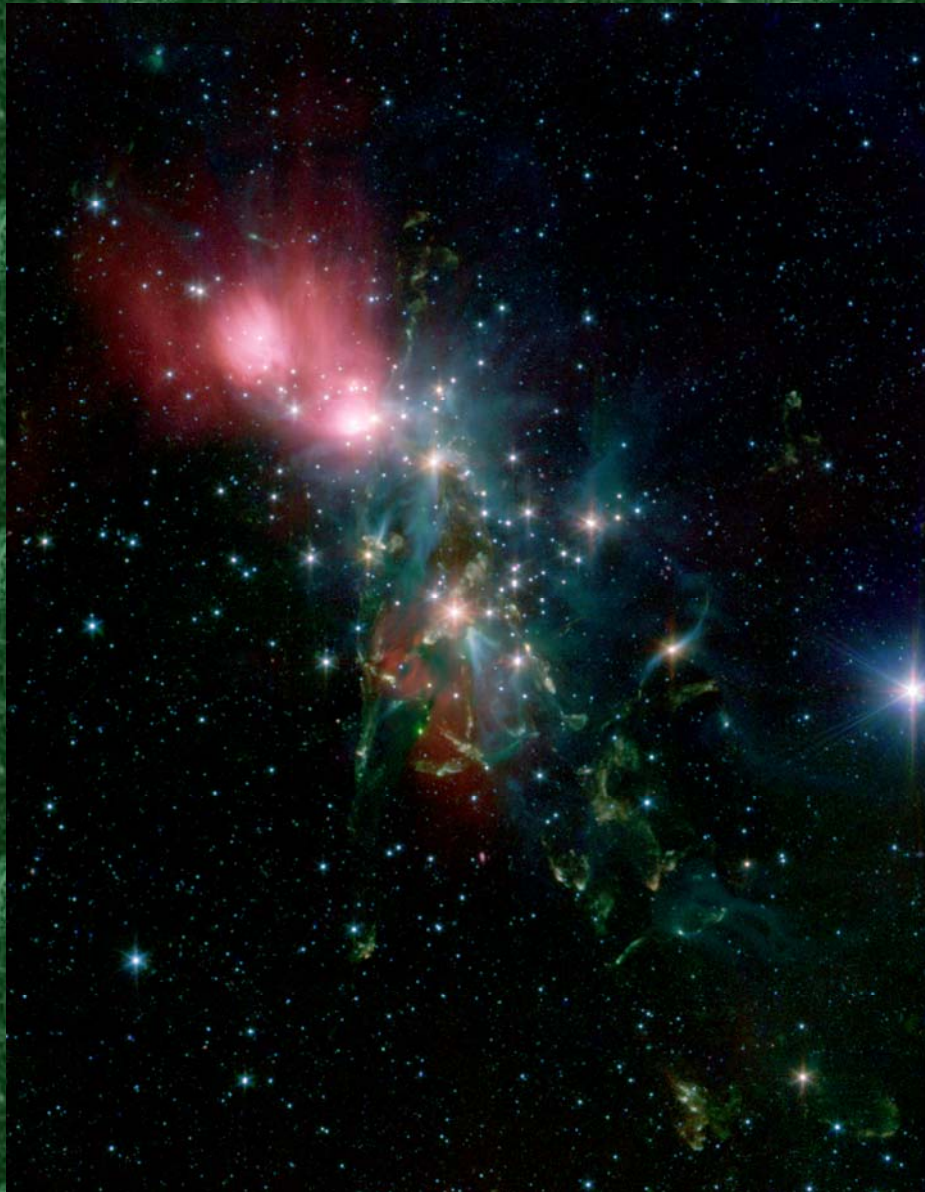




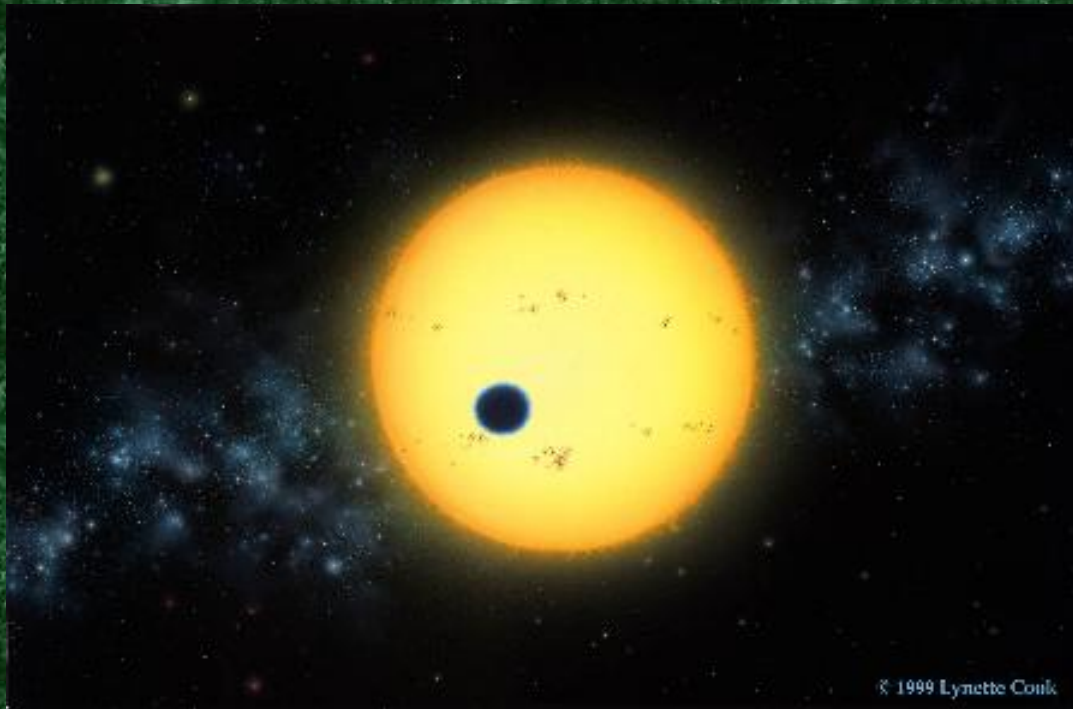




Thüringer Landessternwarte Tautenburg



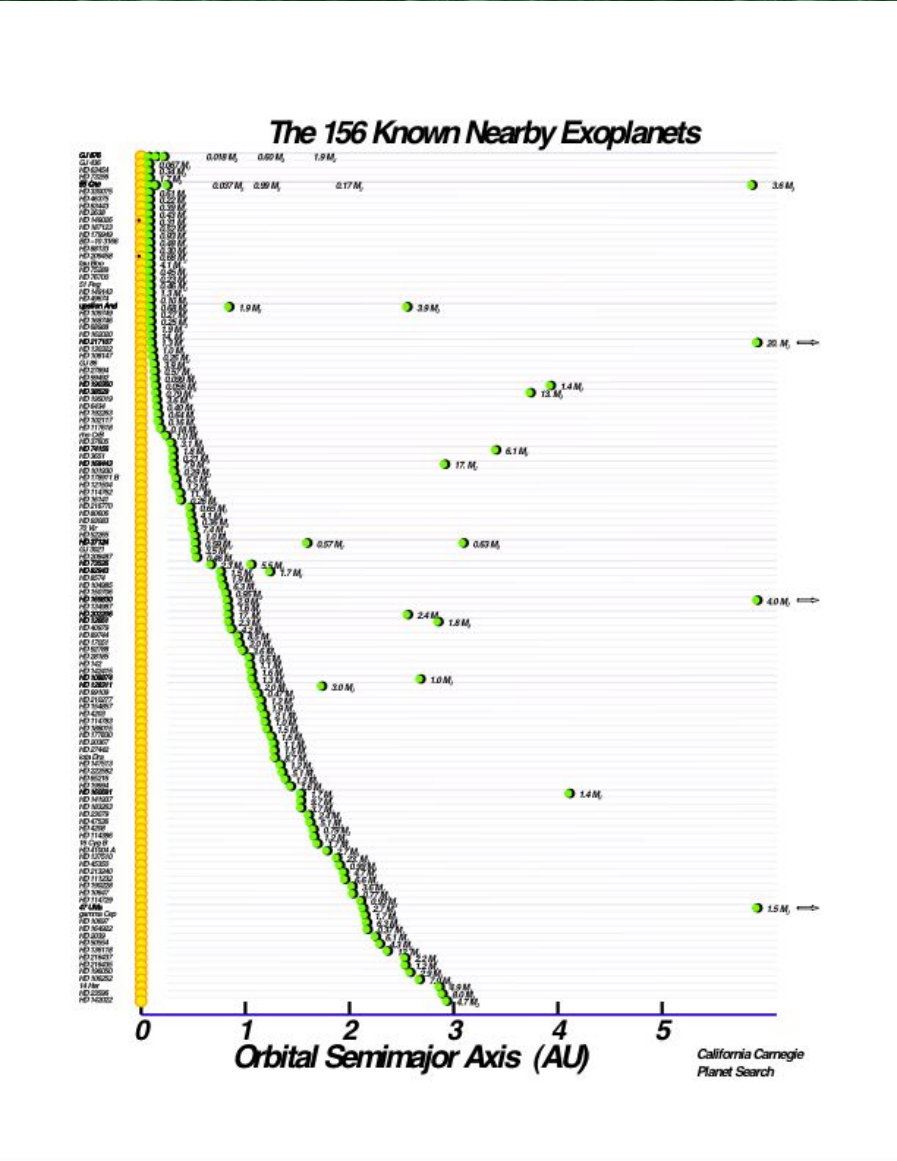
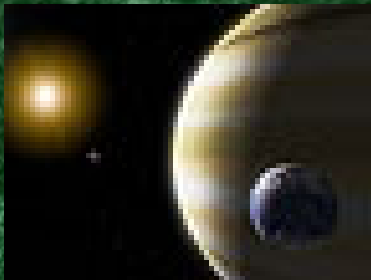
# Planetas Extrasolares



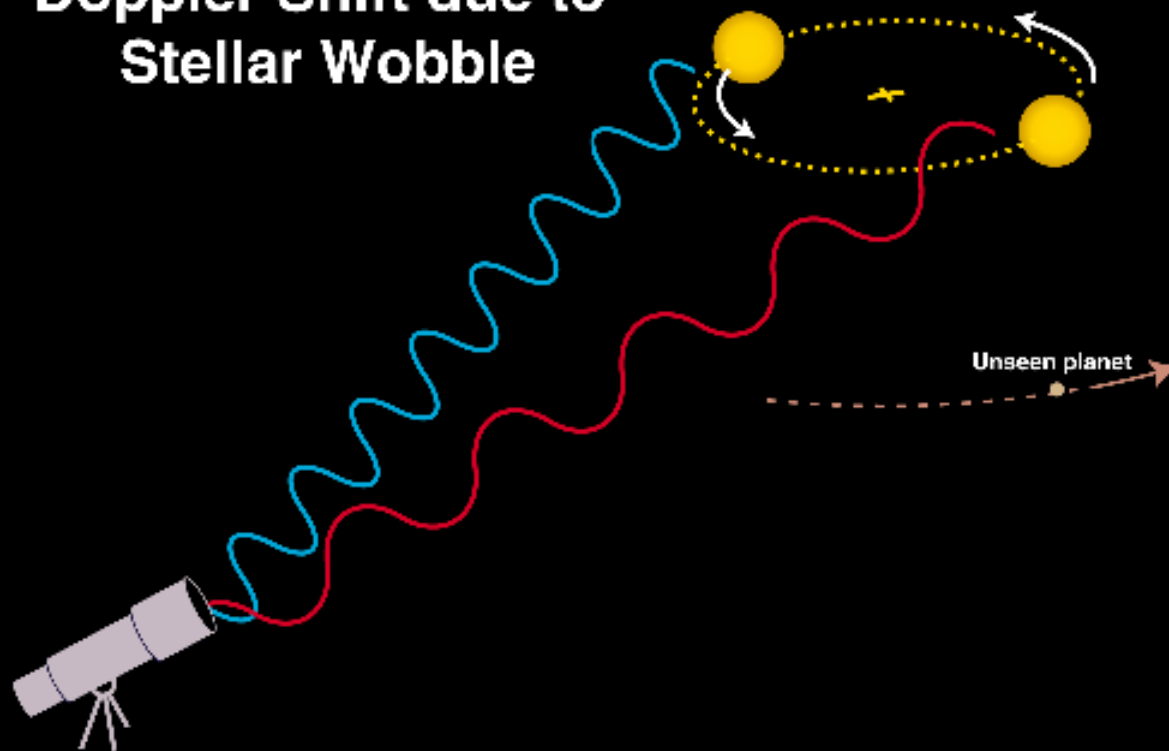
© 1999 Lynette Cook

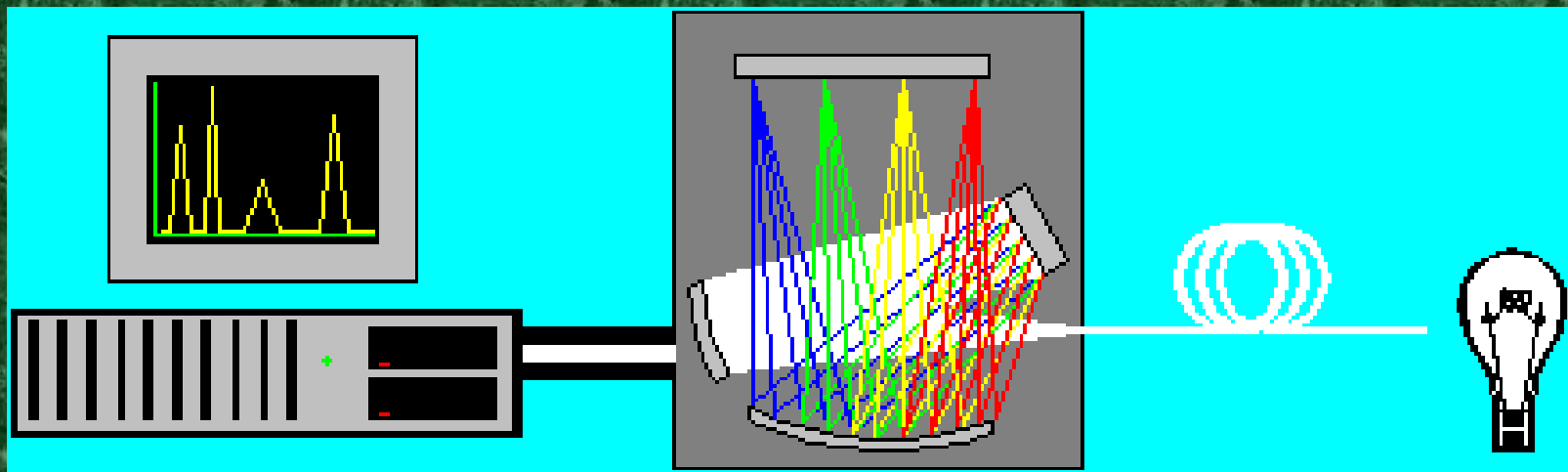


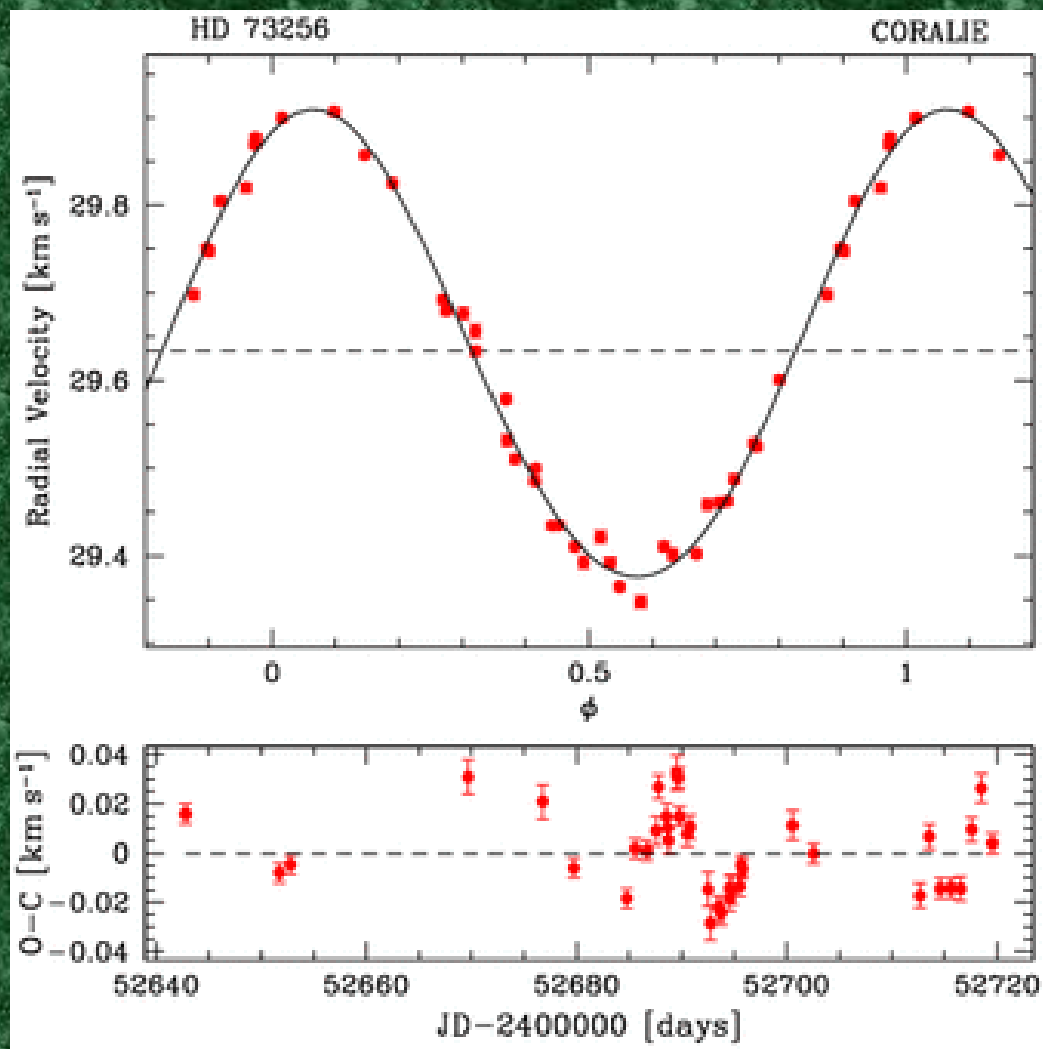


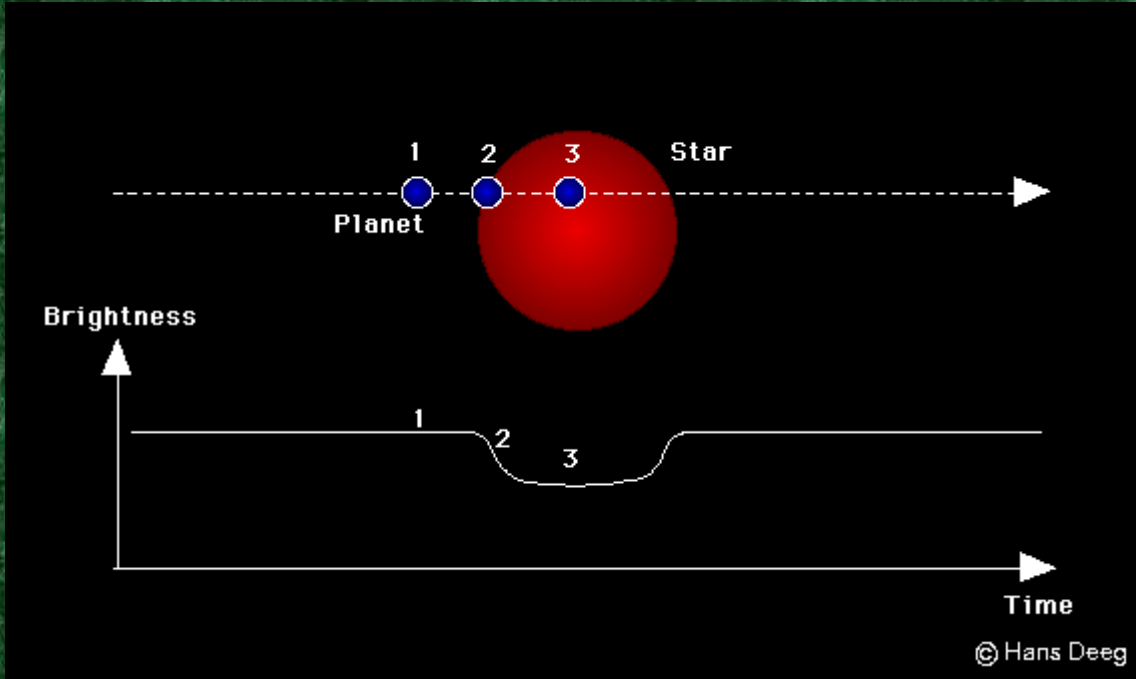


## Doppler Shift due to Stellar Wobble

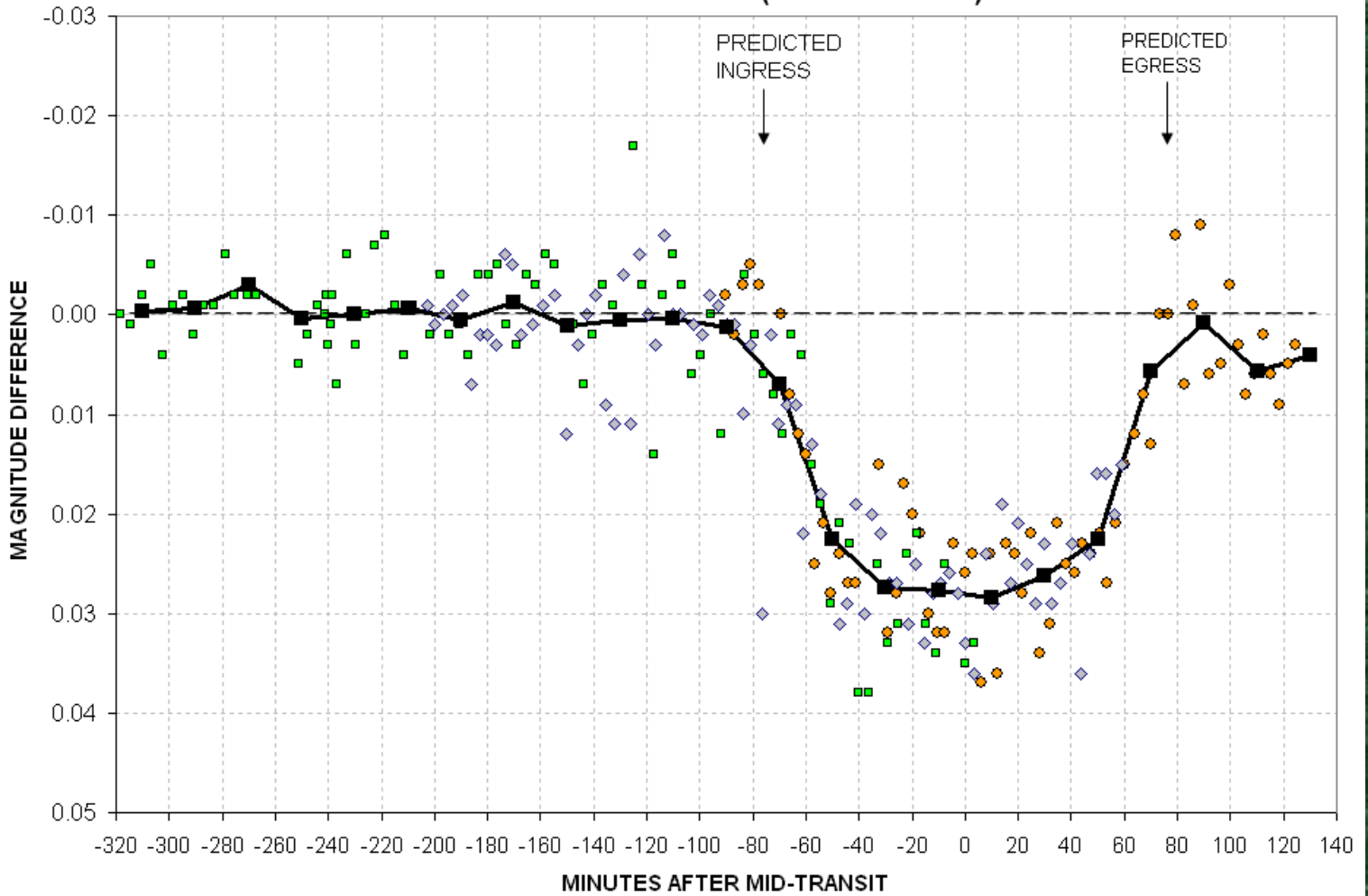


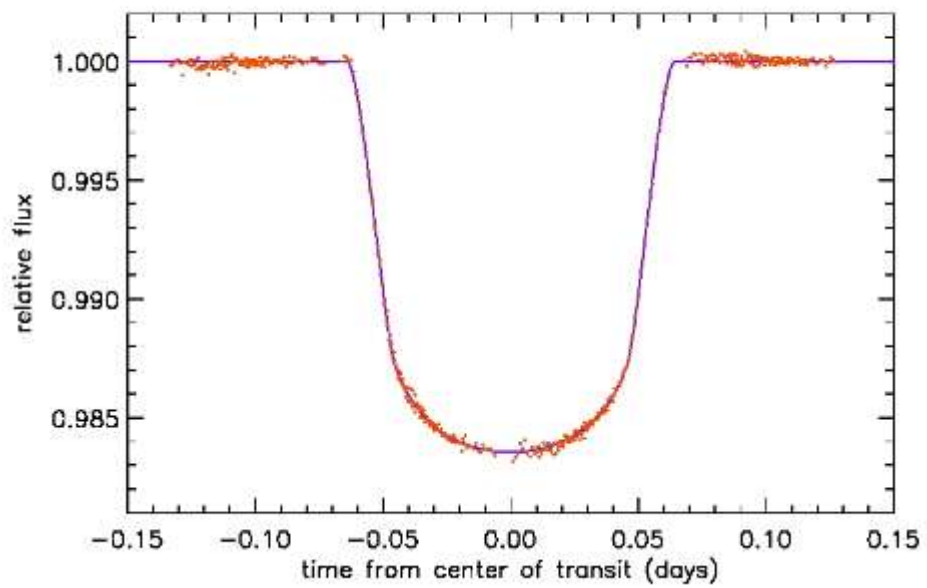




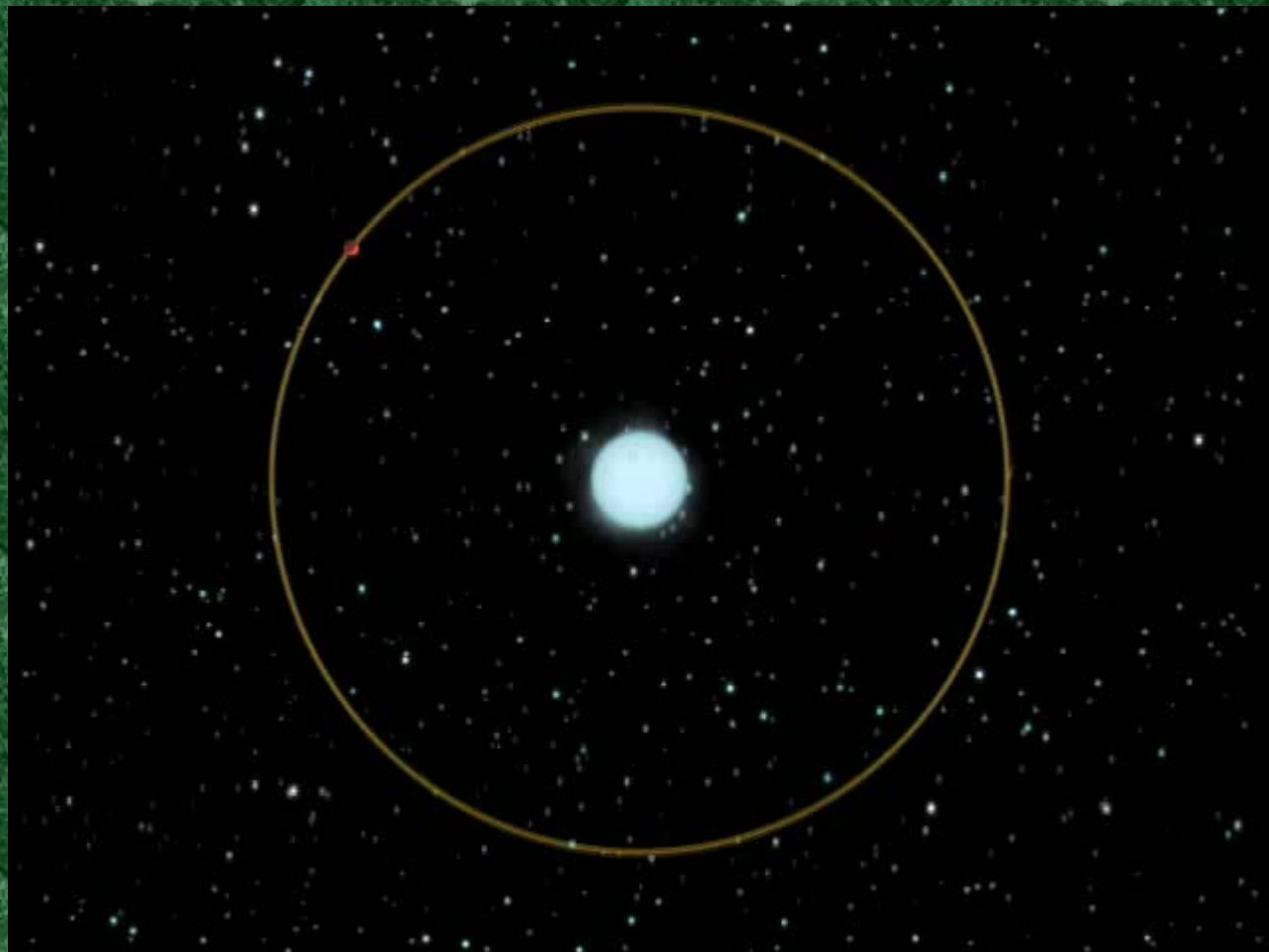


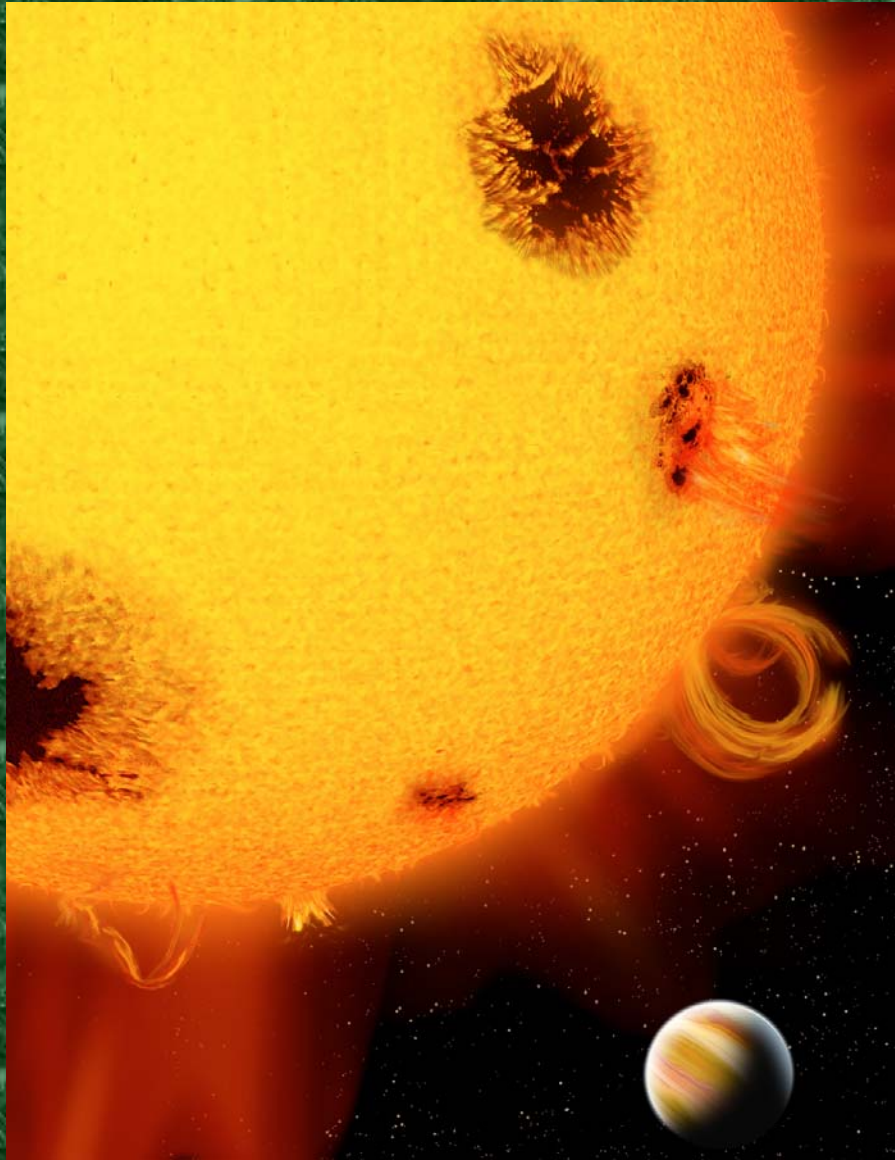
### TrES-1 EXOPLANET TRANSIT (ALL BLG DATA)

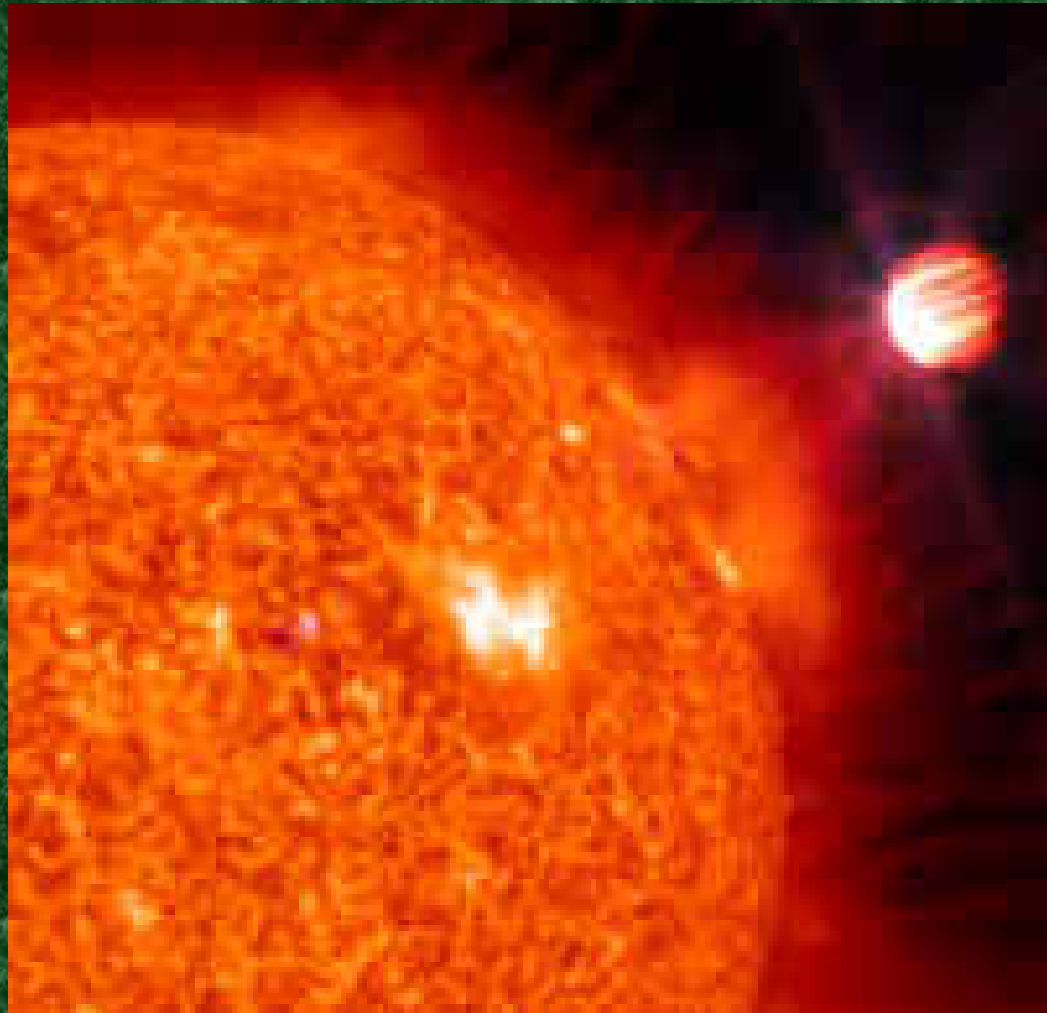


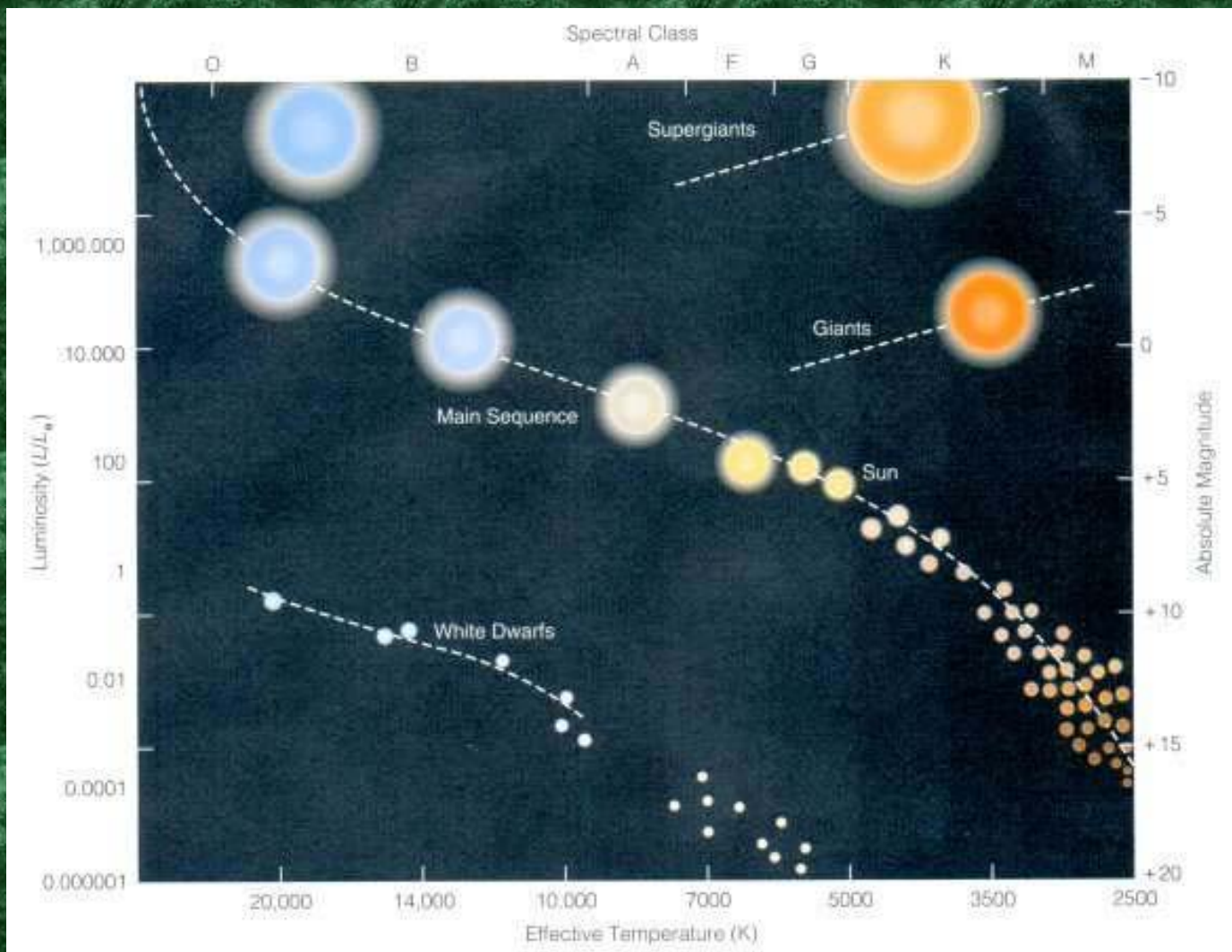






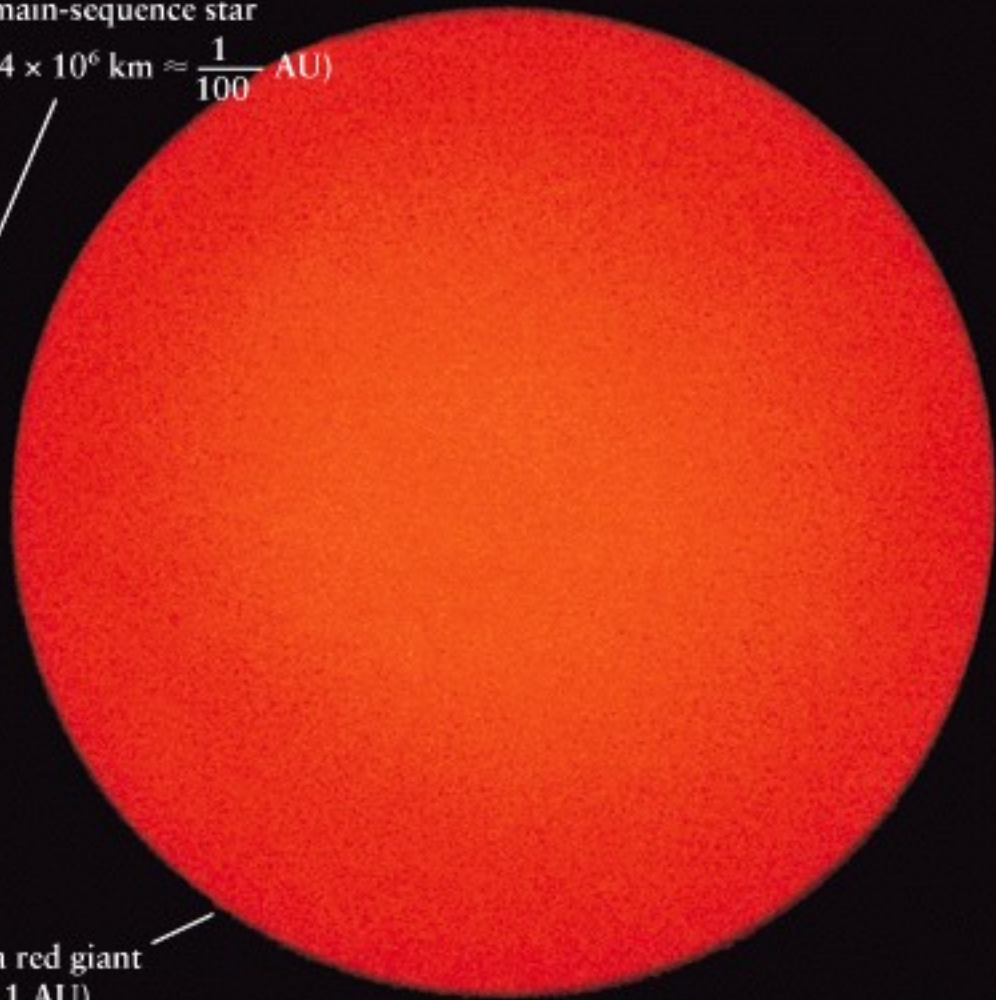






# Gigante Roja

The Sun as a main-sequence star  
(diameter =  $1.4 \times 10^6$  km  $\approx \frac{1}{100}$  AU)



The Sun as a red giant  
(diameter = 1 AU)

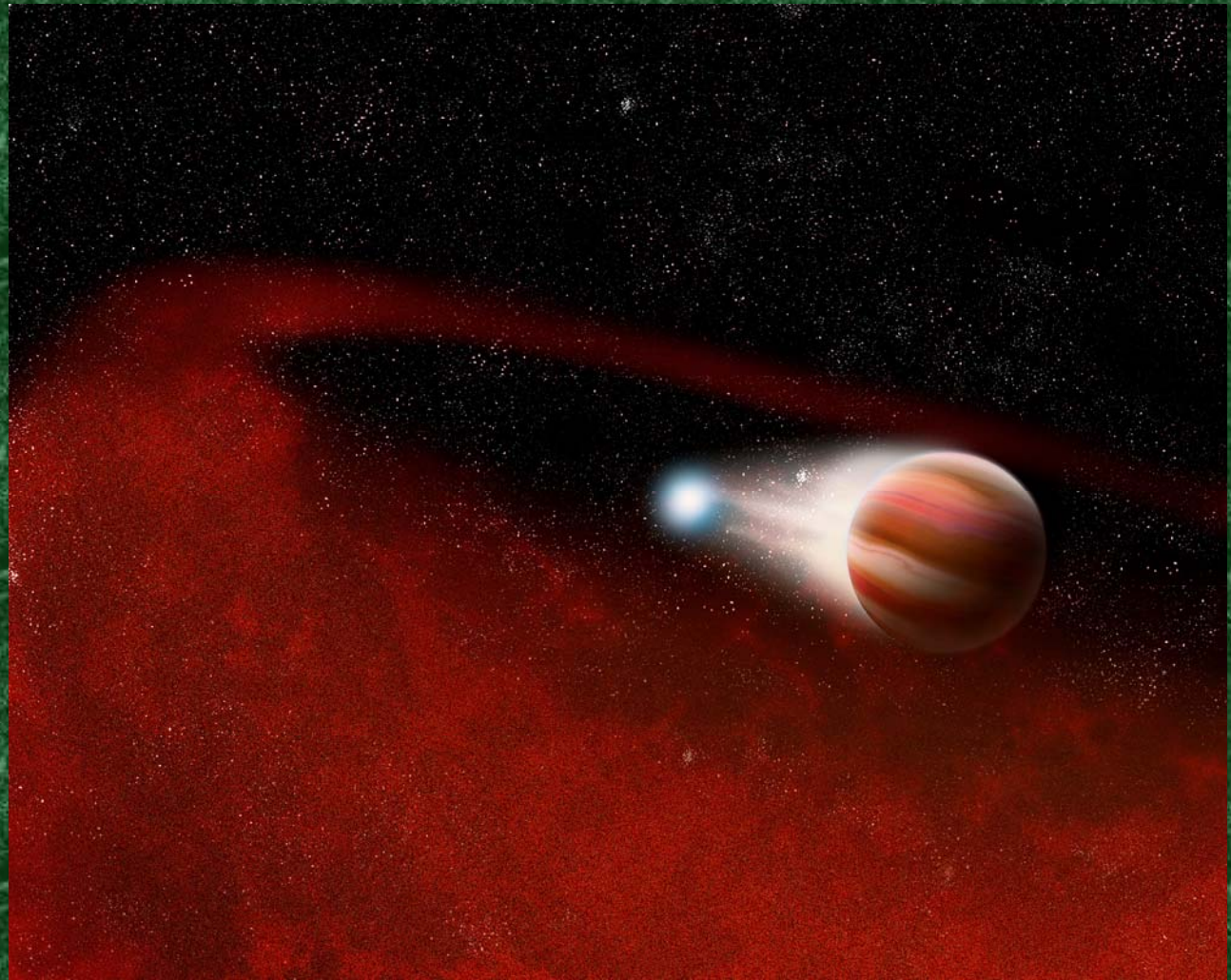
# Planetas de Segunda Generación o Planetas Fénix



# Planetas en Estrellas Viejas o Gigantes Rojas

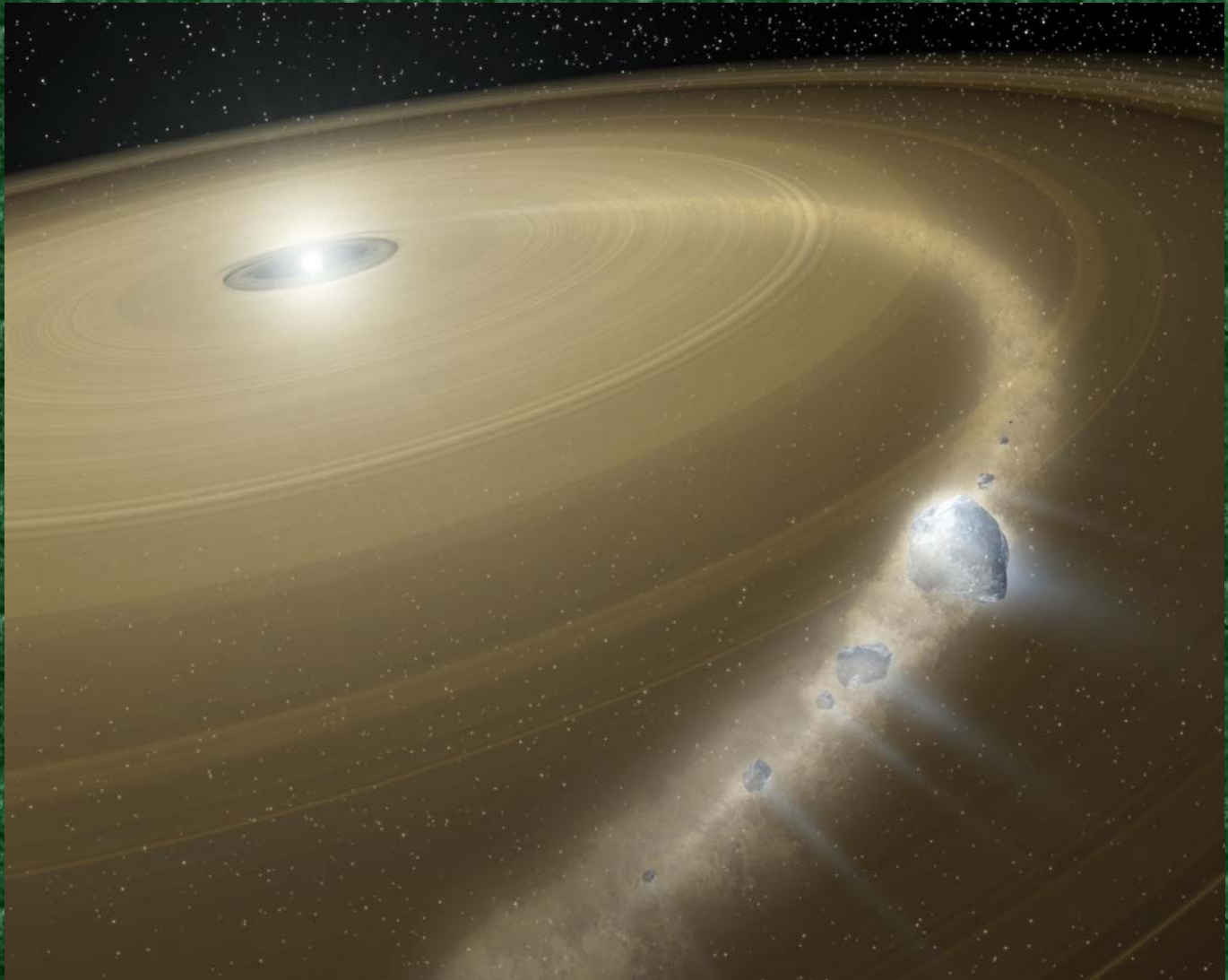


# Discos y Planetas en Estrellas Viejas (Gigantes Rojas)





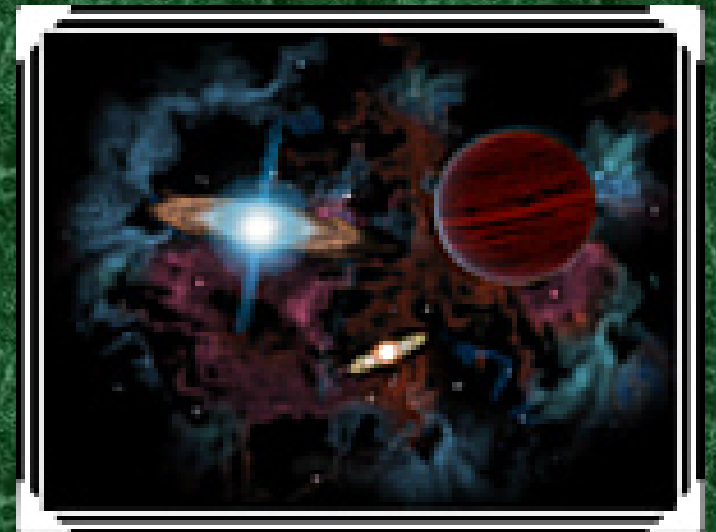
# Discos y Planetas en Enanas Blancas

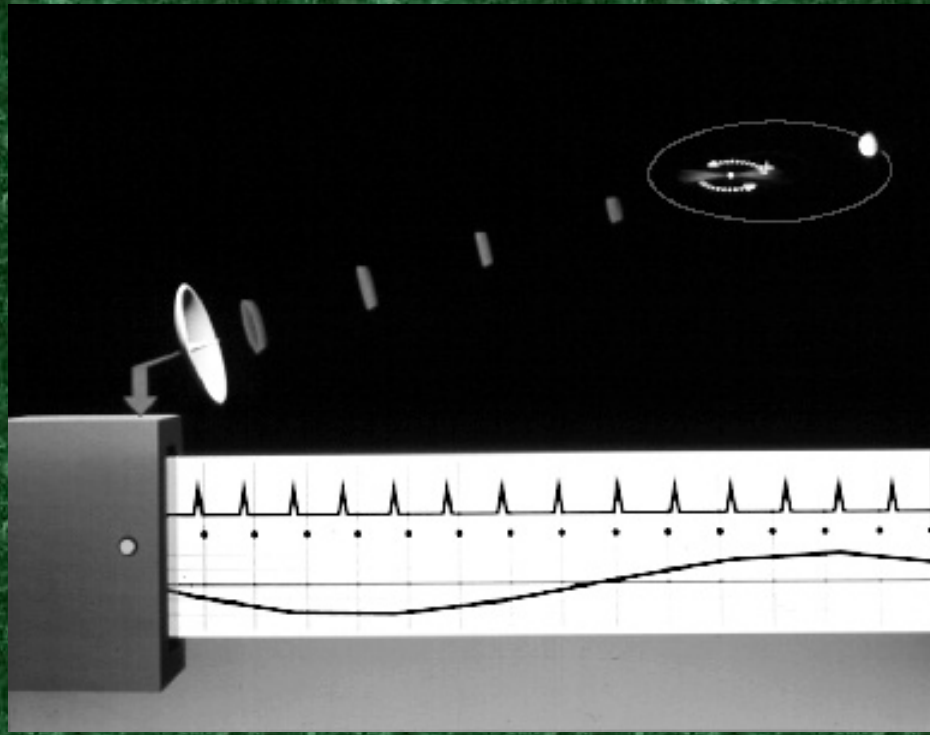


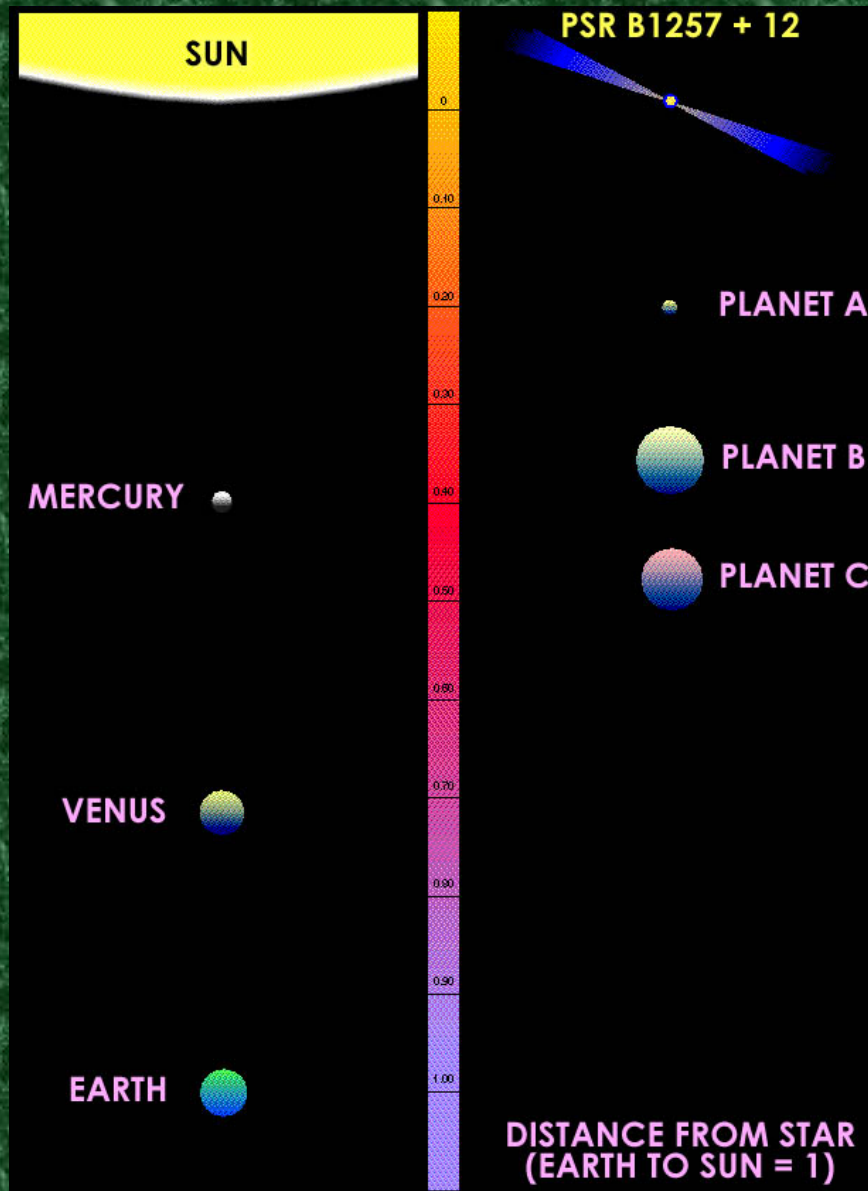


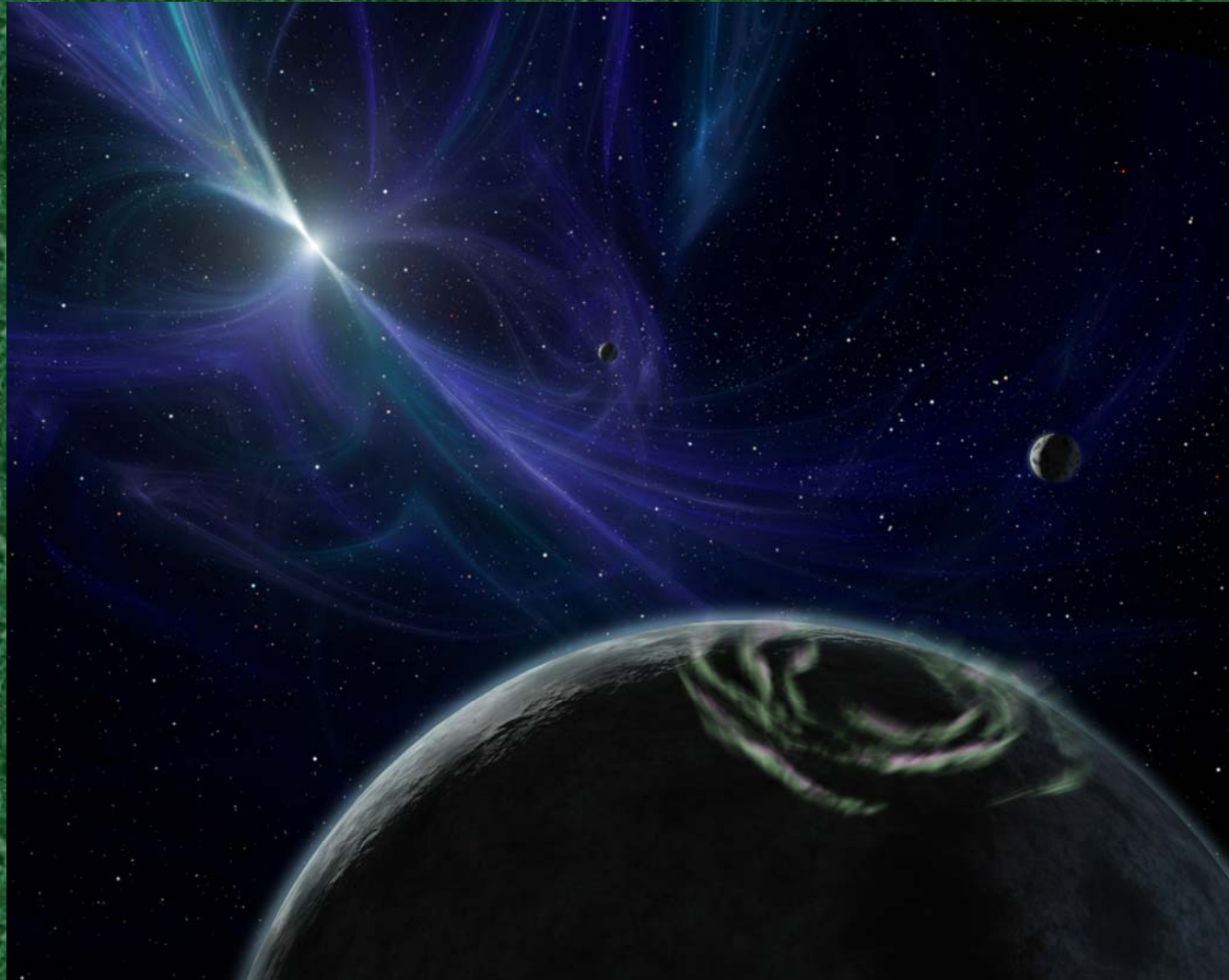


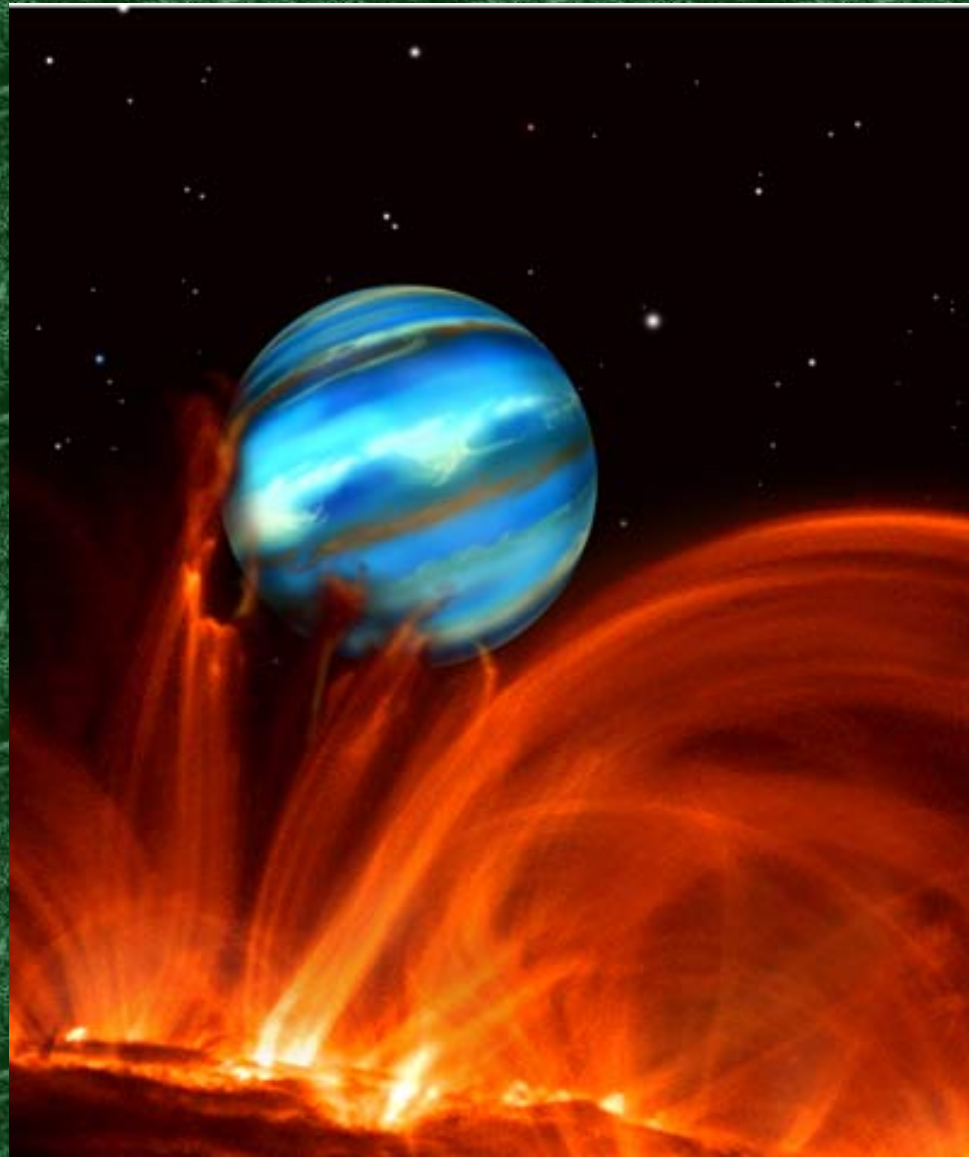
# Planetas en Pulsars













# ¿Planetas en todo tipo de Estrellas?

- Discos en todo tipo de Estrellas Jóvenes y en las Enanas Marrones
- ¿Planetas de Segunda Generación en estrellas Viejas (Gigantes Rojas y/o Enanas Blancas)?
- Planetas en Pulsars
- ¿Qué tipo de planetas se forman en cada tipo de estrellas? ¿Próximas Misiones Espaciales?