Gigantes Gaseosos y Planetas Extrasolares

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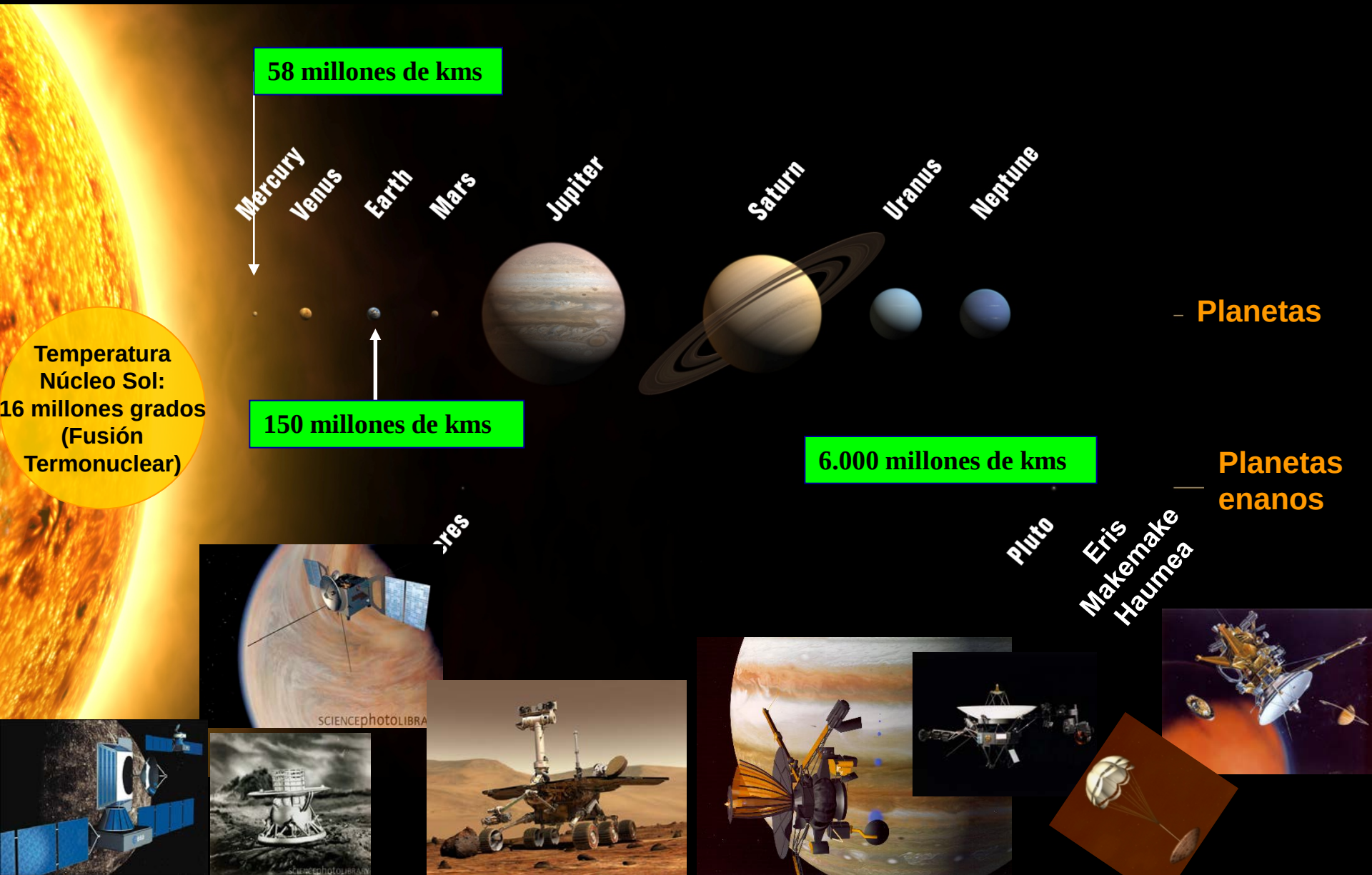
Número galaxias = 200.000 millones
Número medio de estrellas por galaxia = 100.000 millones
Edad del Universo (“Big Bang”) = 13.750 millones de años

Nuestra Galaxia: La Vía Láctea

Tamaño galaxia = 100.000 años-luz

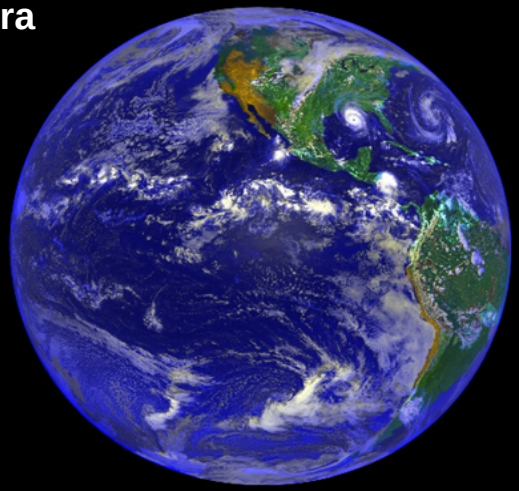
Distancia Sol – Centro = 30.000 años-luz

Planetas del Sistema Solar



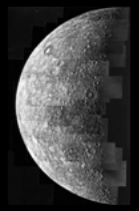
Planetas Terrestres y Satélites Principales

Tierra



Marte

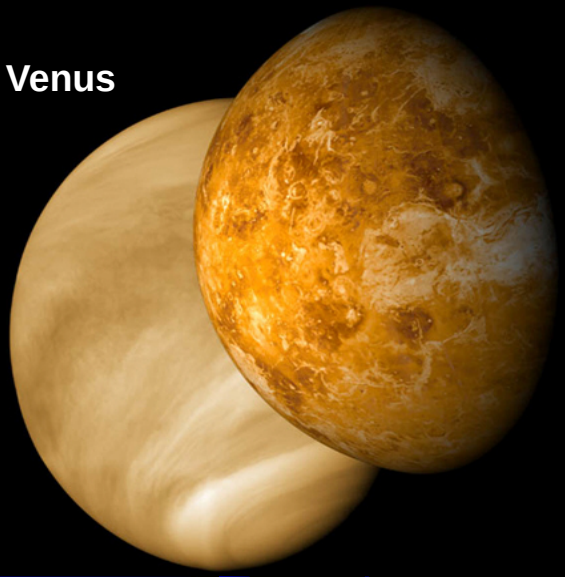
Mercurio



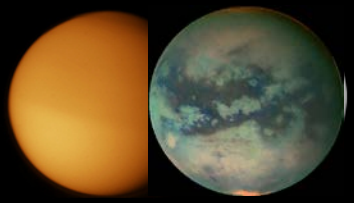
Luna

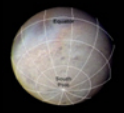
Satélites Galileanos de Júpiter

Venus



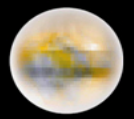
Titán





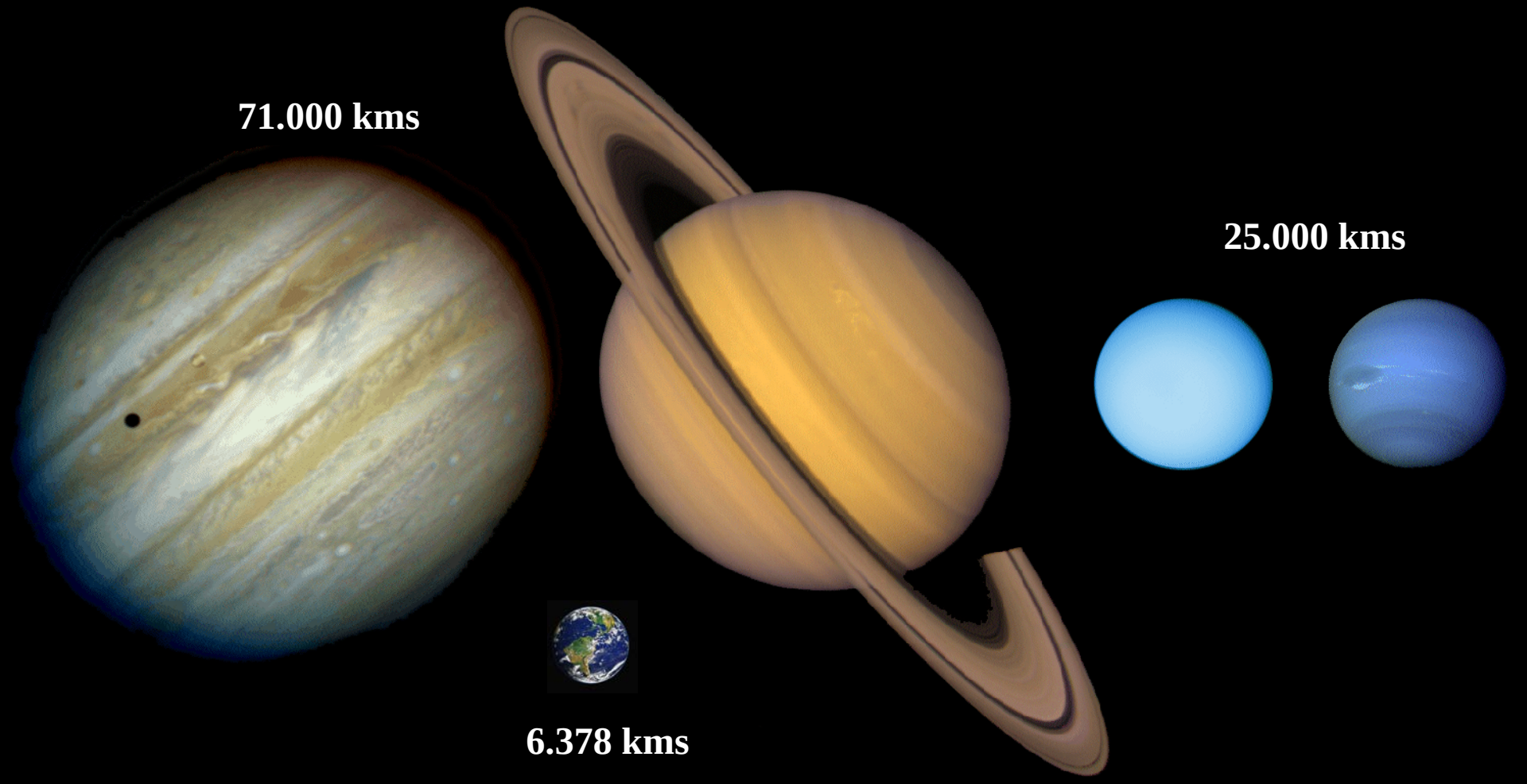
Tritón

Plutón

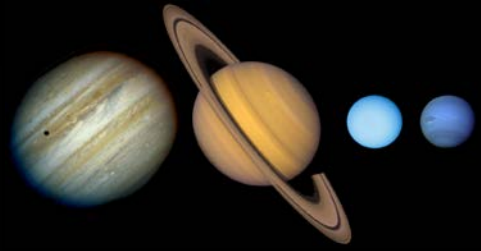


"Explorando otros mundos conoceremos mejor el nuestro"

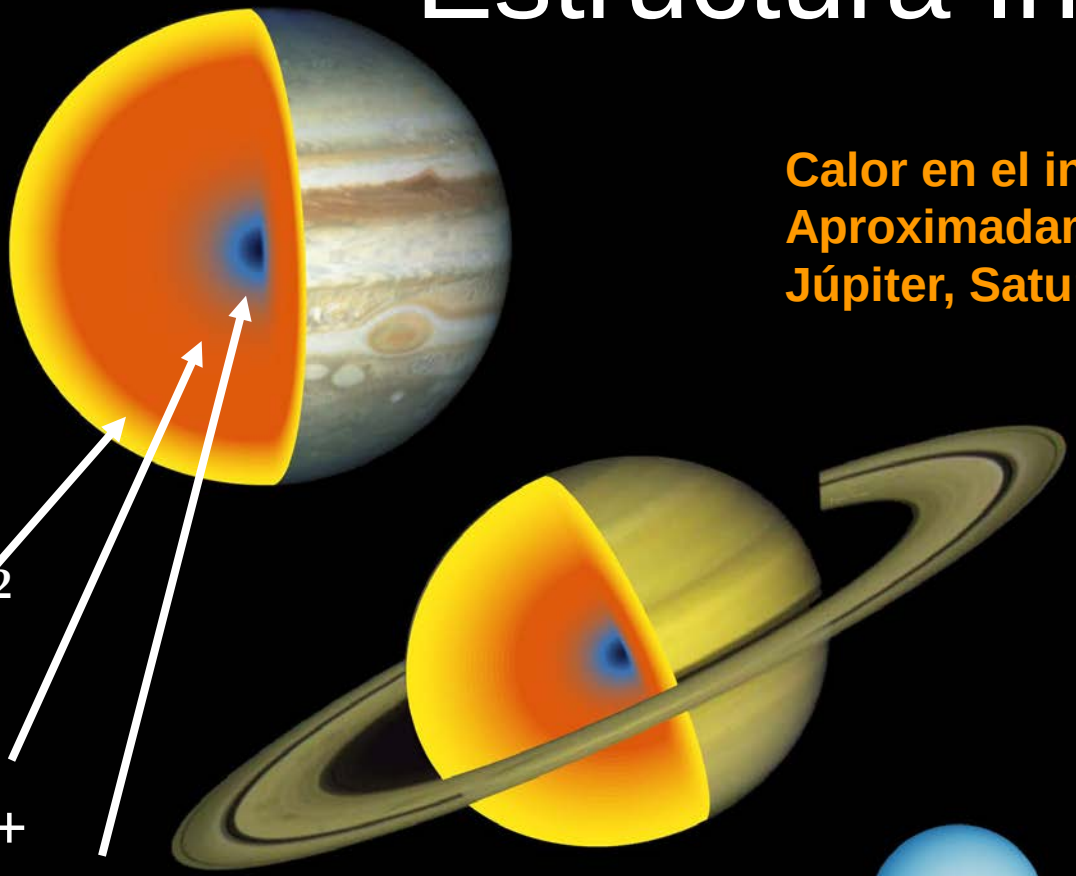
Planetas Gigantes



Estructura Interna



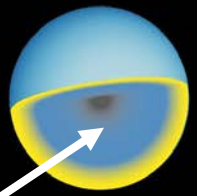
Calor en el interior:
Aproximadamente doble de la radiación solar
Júpiter, Saturno, Neptuno



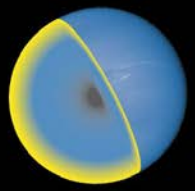
H_2

H+

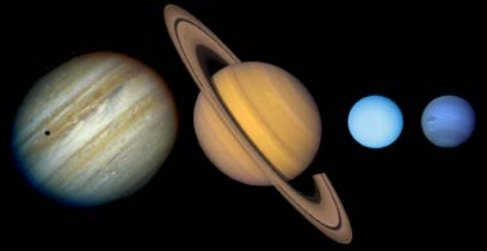
¿Núcleo?

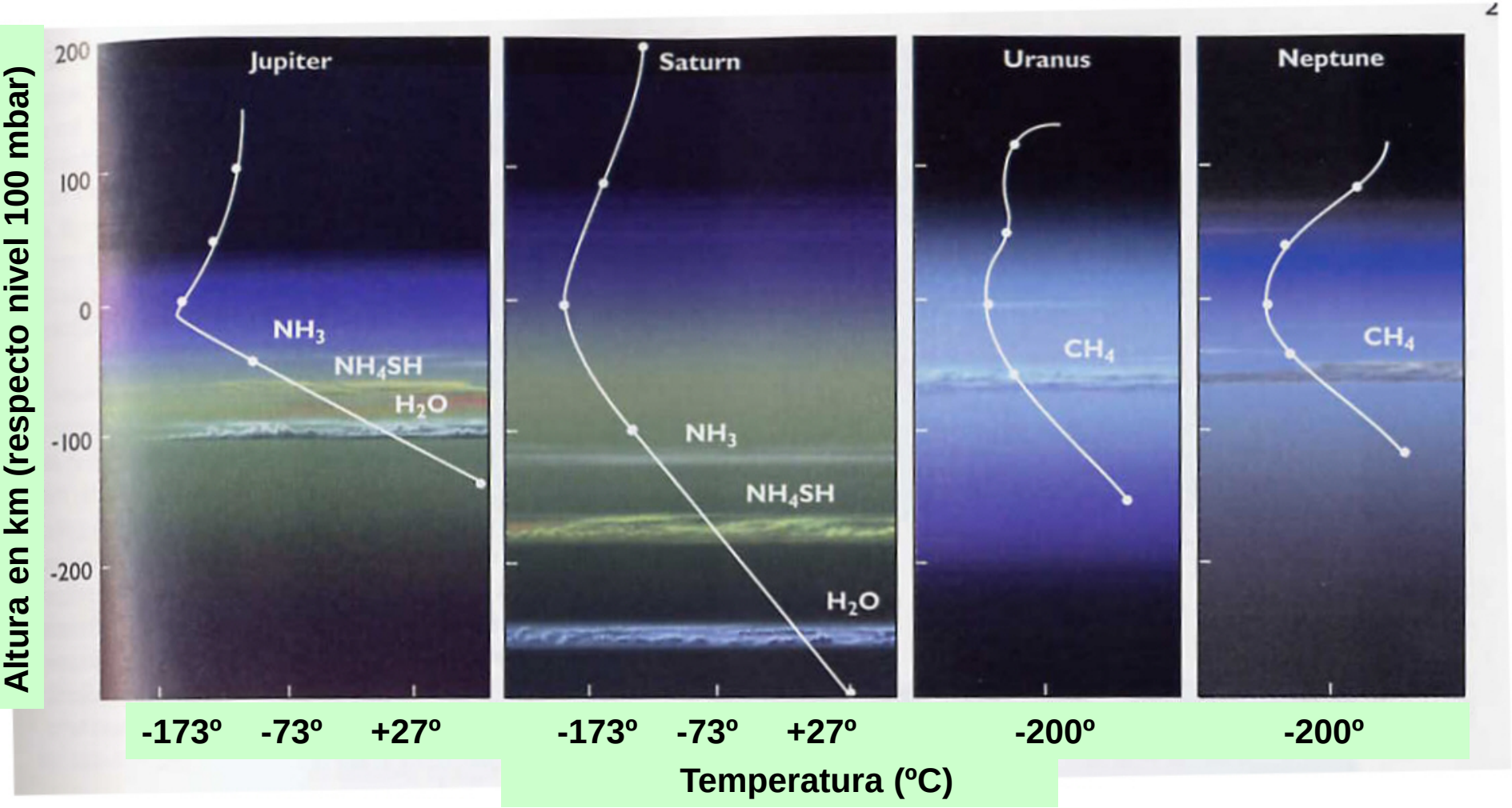


Hielos
(H_2O, NH_3, CH_4)

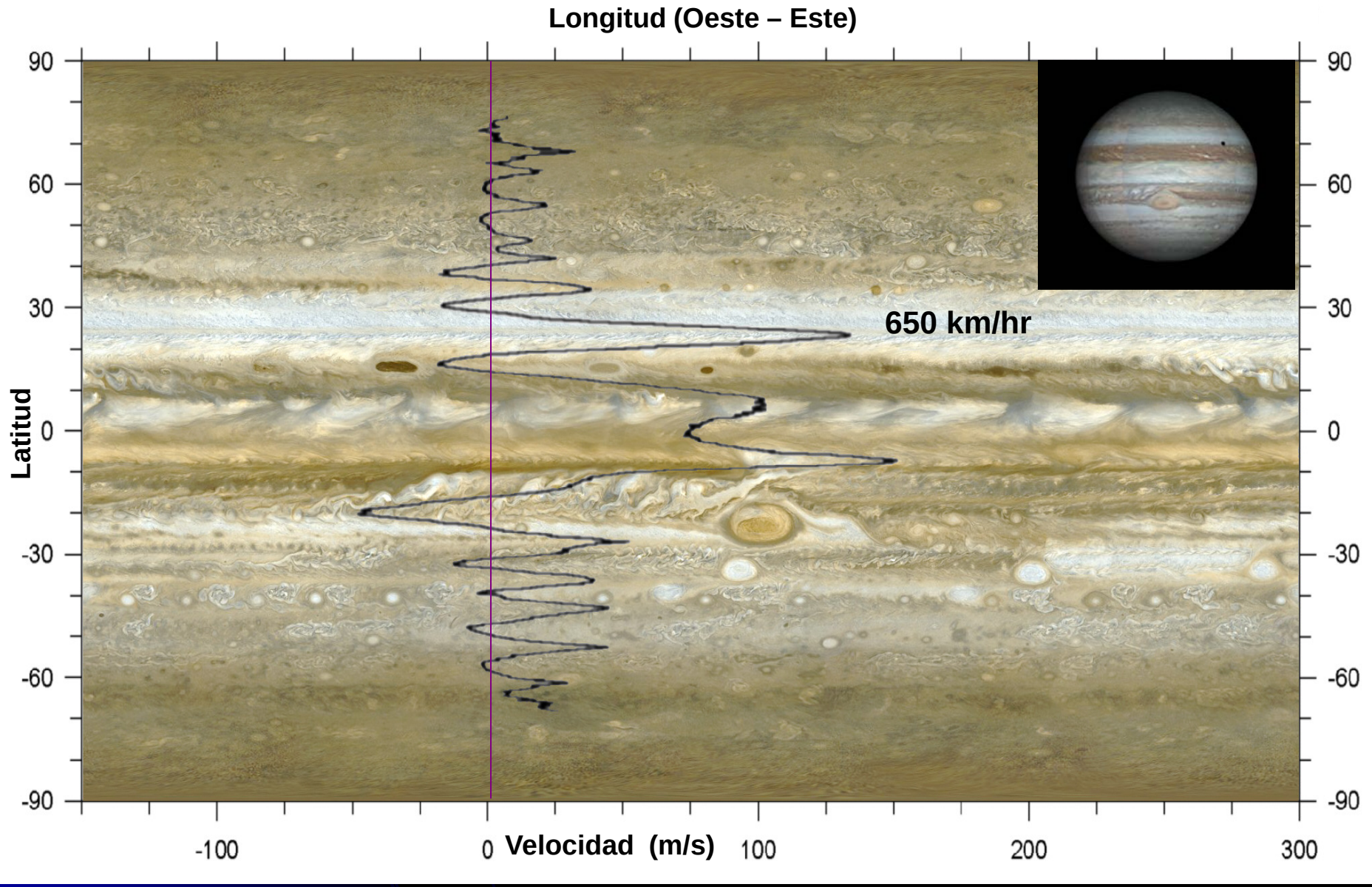


Atmósferas: Temperatura y Nubes

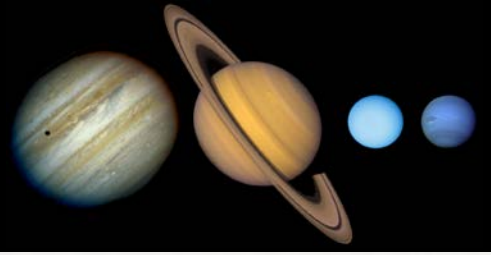


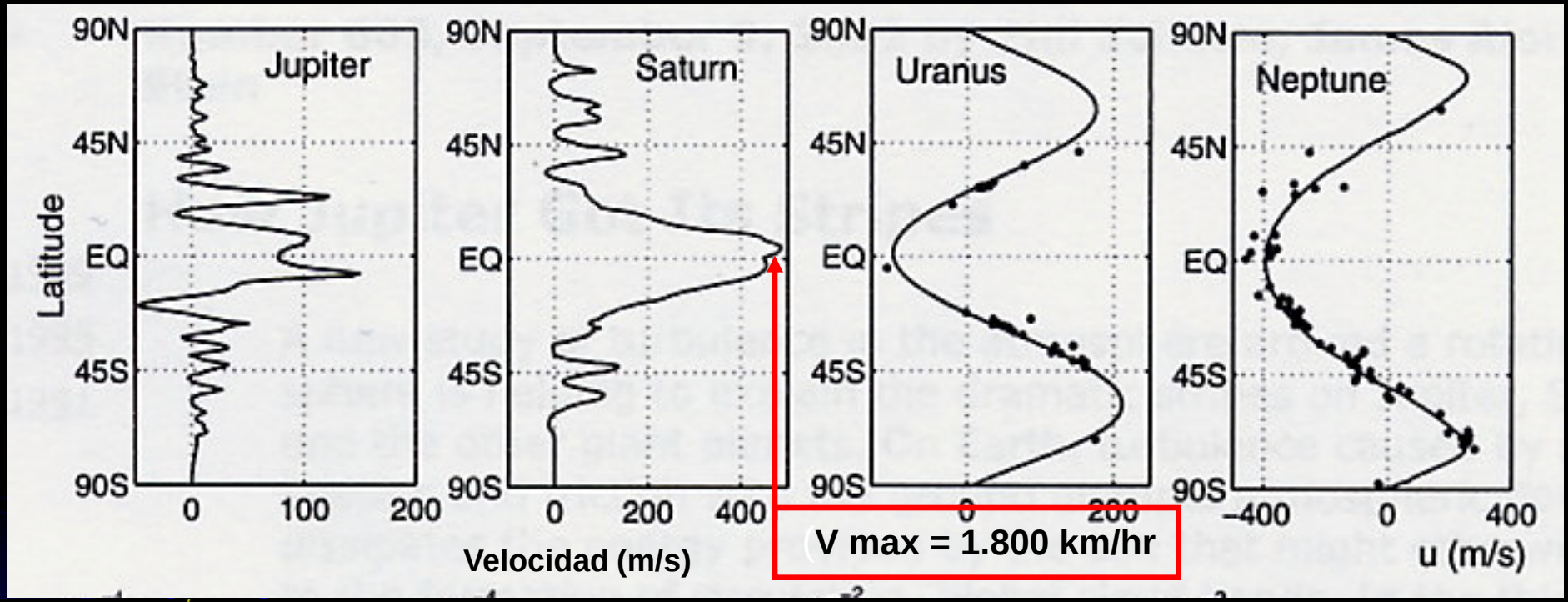


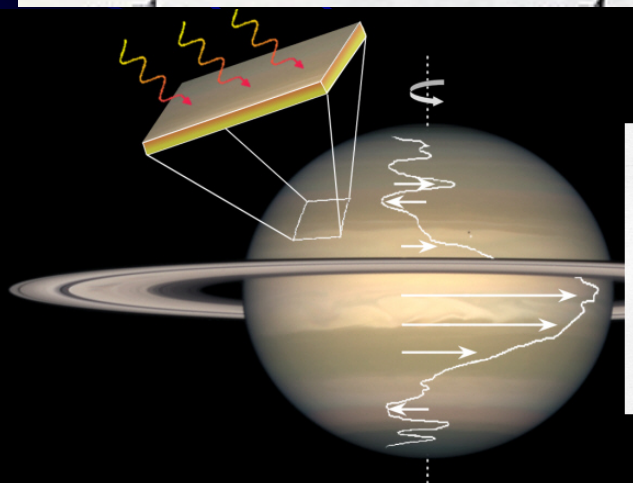
Júpiter: Nubes y Vientos

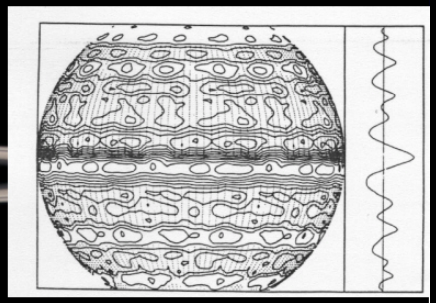


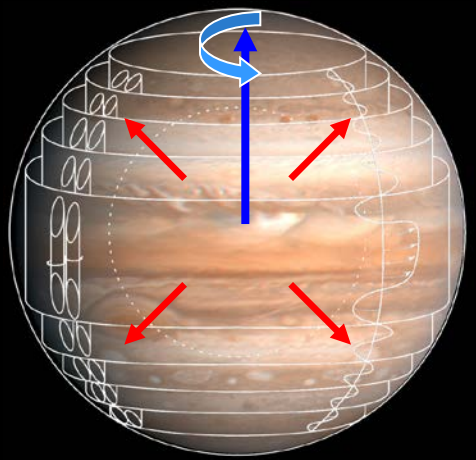
Atmósferas Gigantes: Intensos Vientos



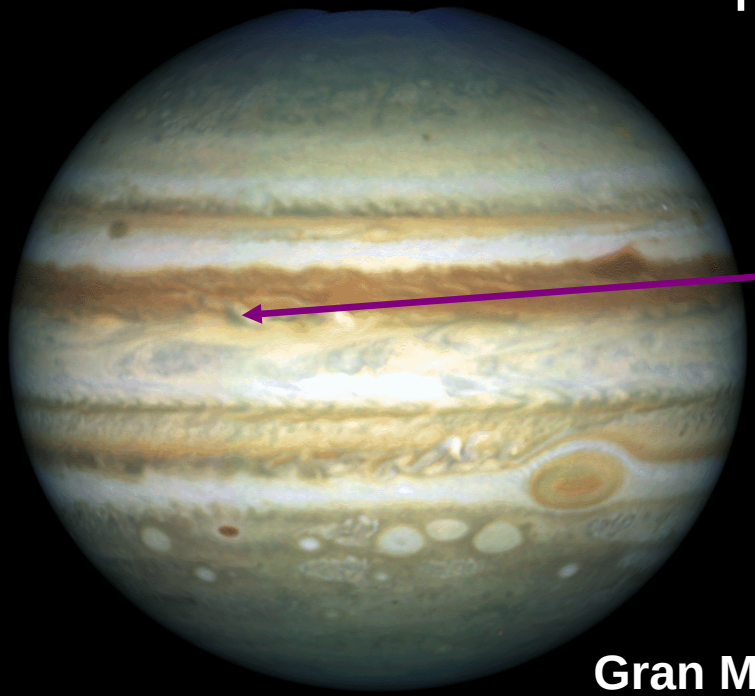


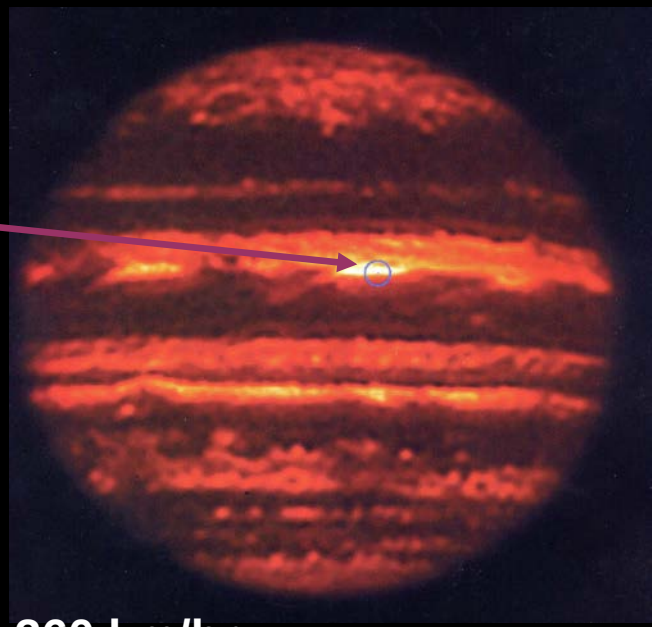




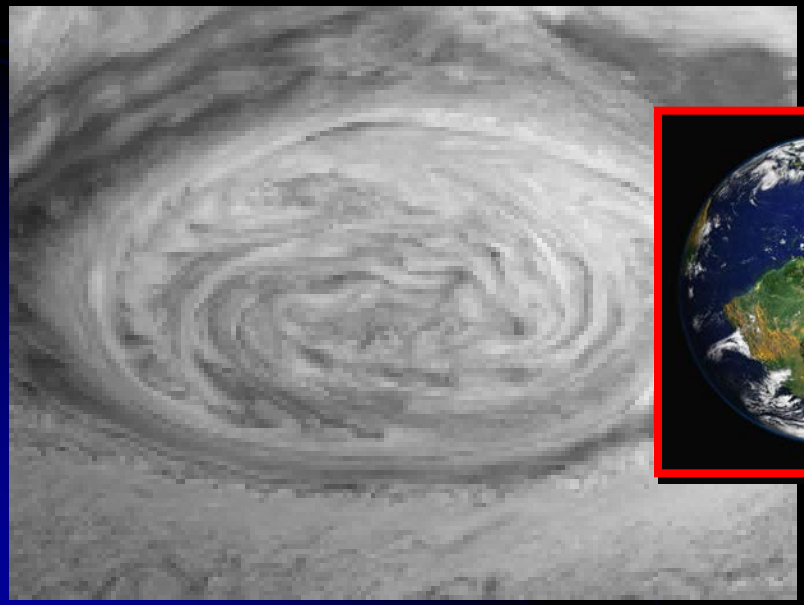


Júpiter: Meteorología

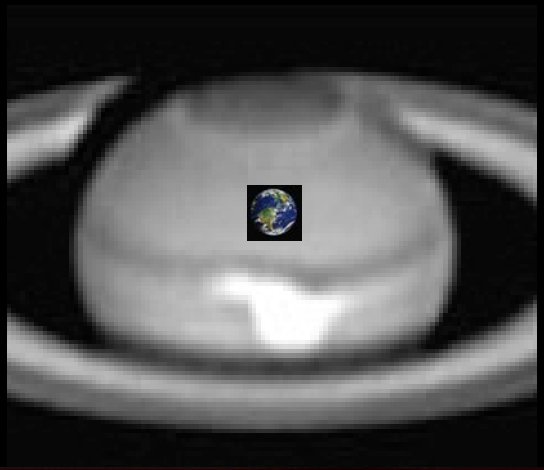




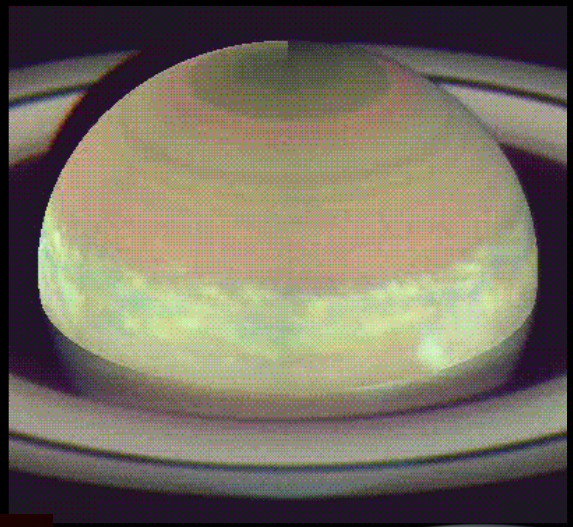
Gran Mancha Roja: Vientos 360 km/hr



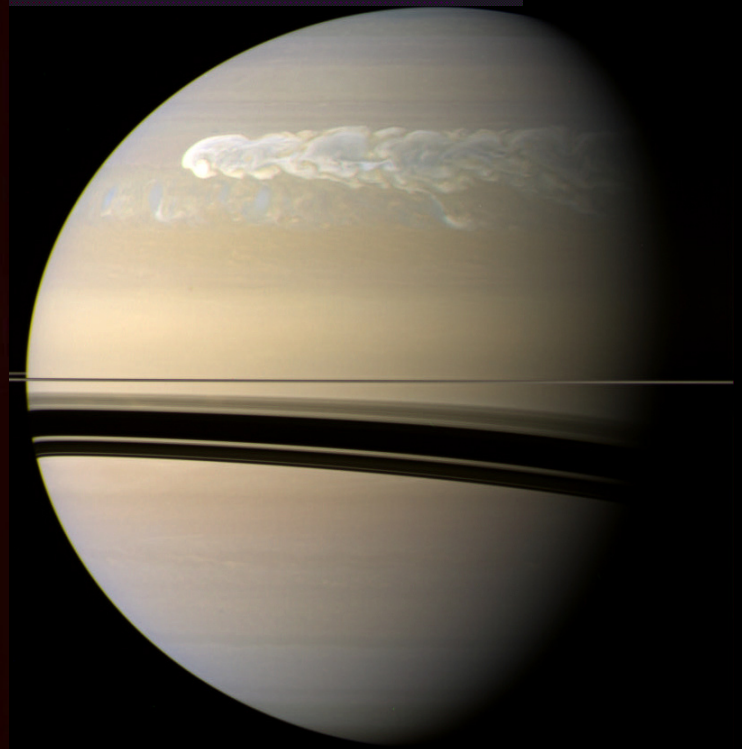
Saturno: Grandes Manchas Blancas



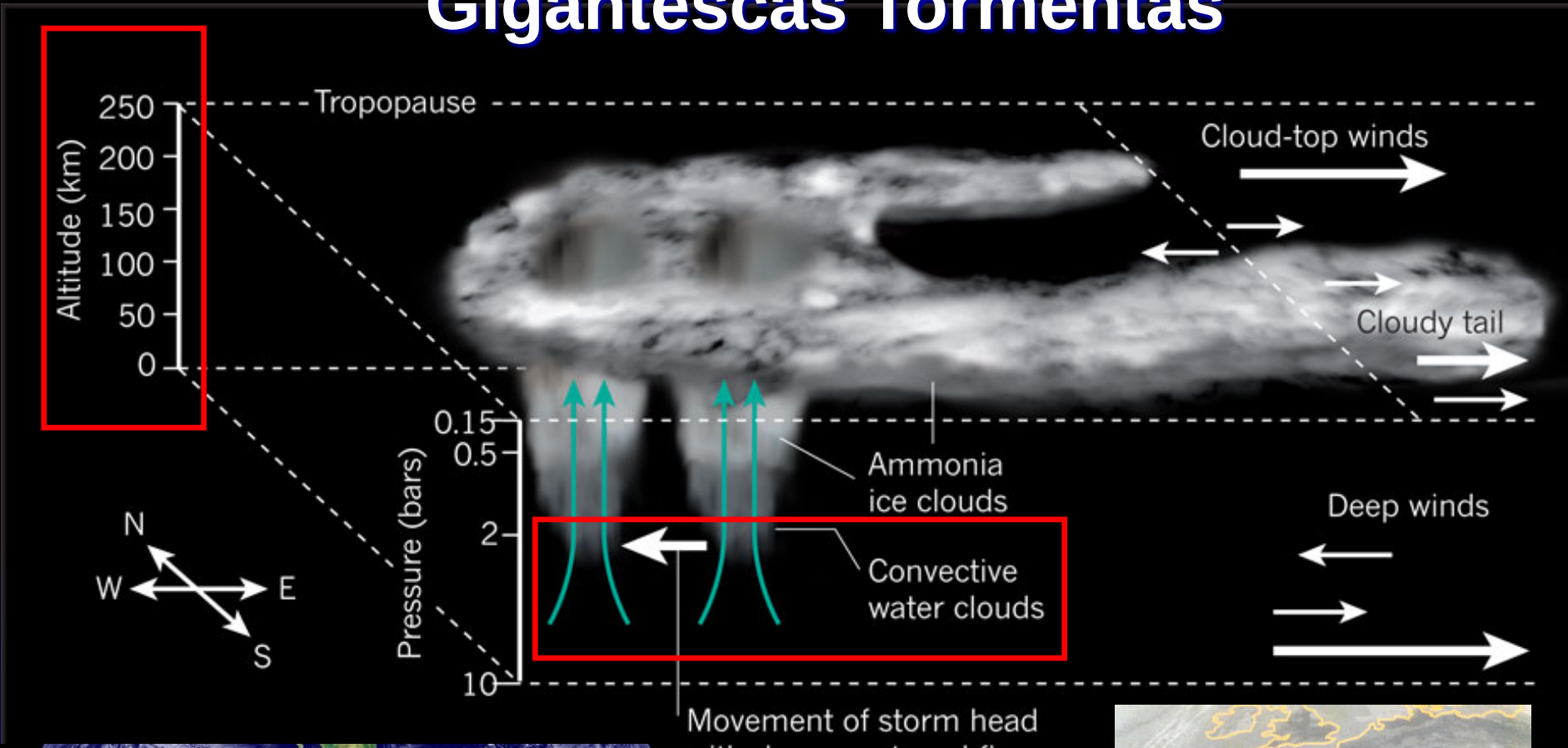
1990

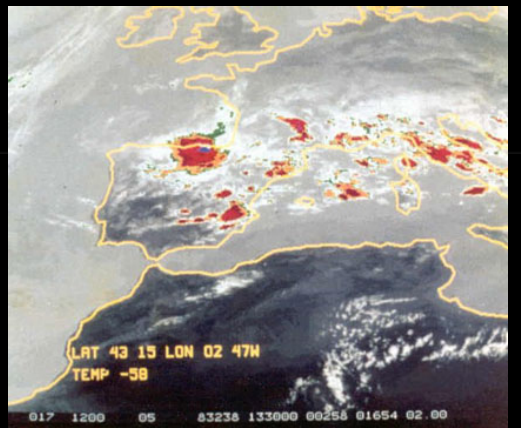


2010

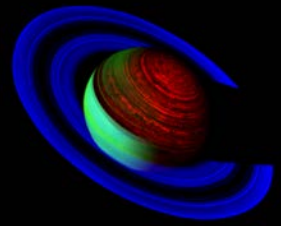


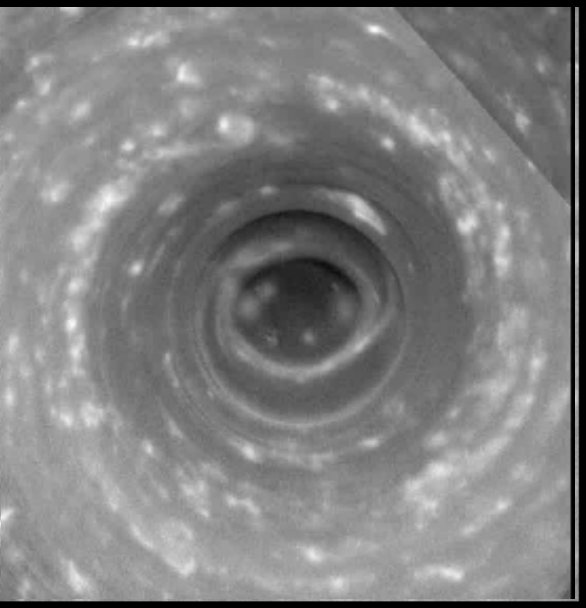
Grandes Manchas Blancas de Saturno: Gigantescas Tormentas





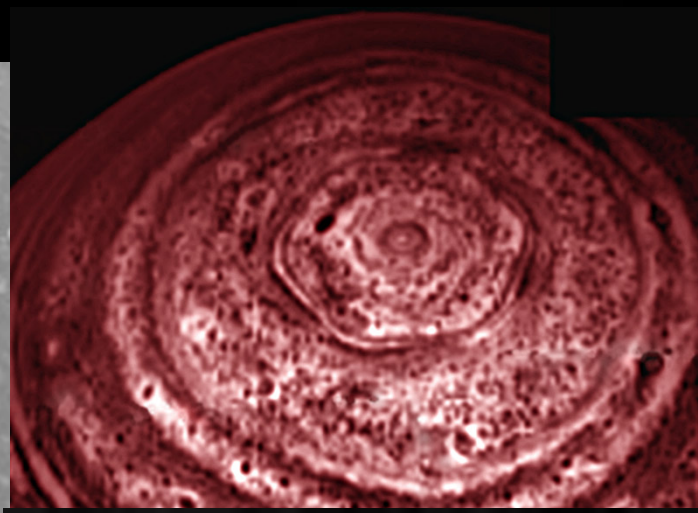
Polos de Saturno



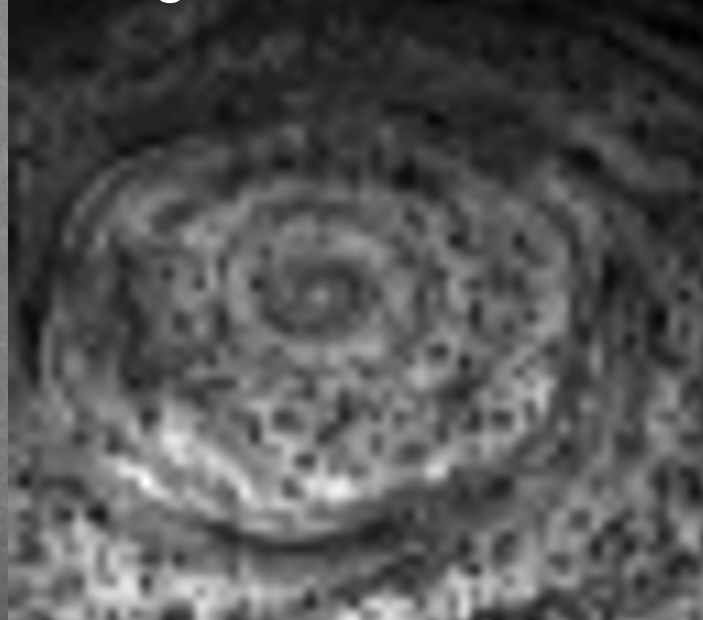


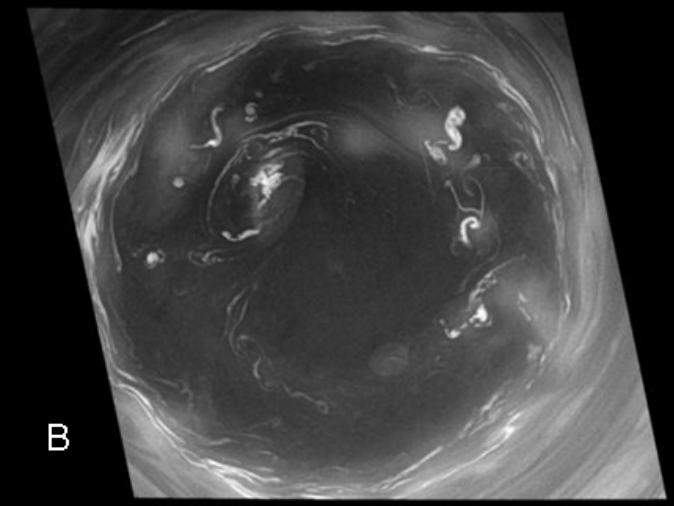
C

Ciclón en Polo Sur



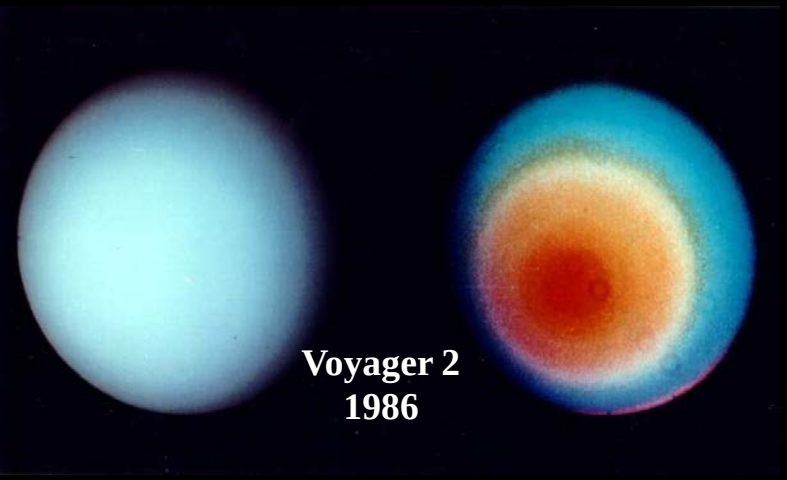
Hexágono en Polo Norte



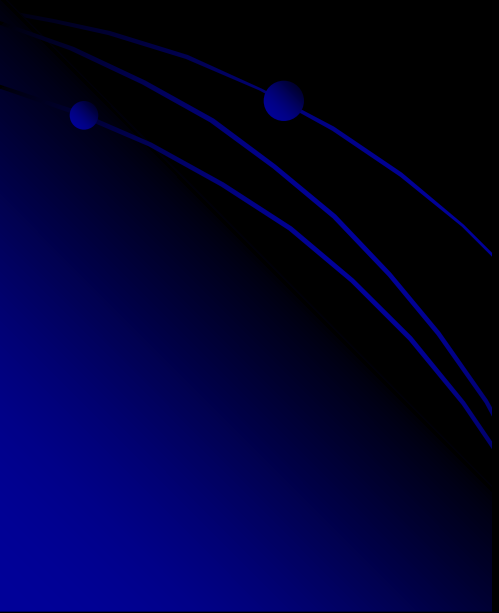


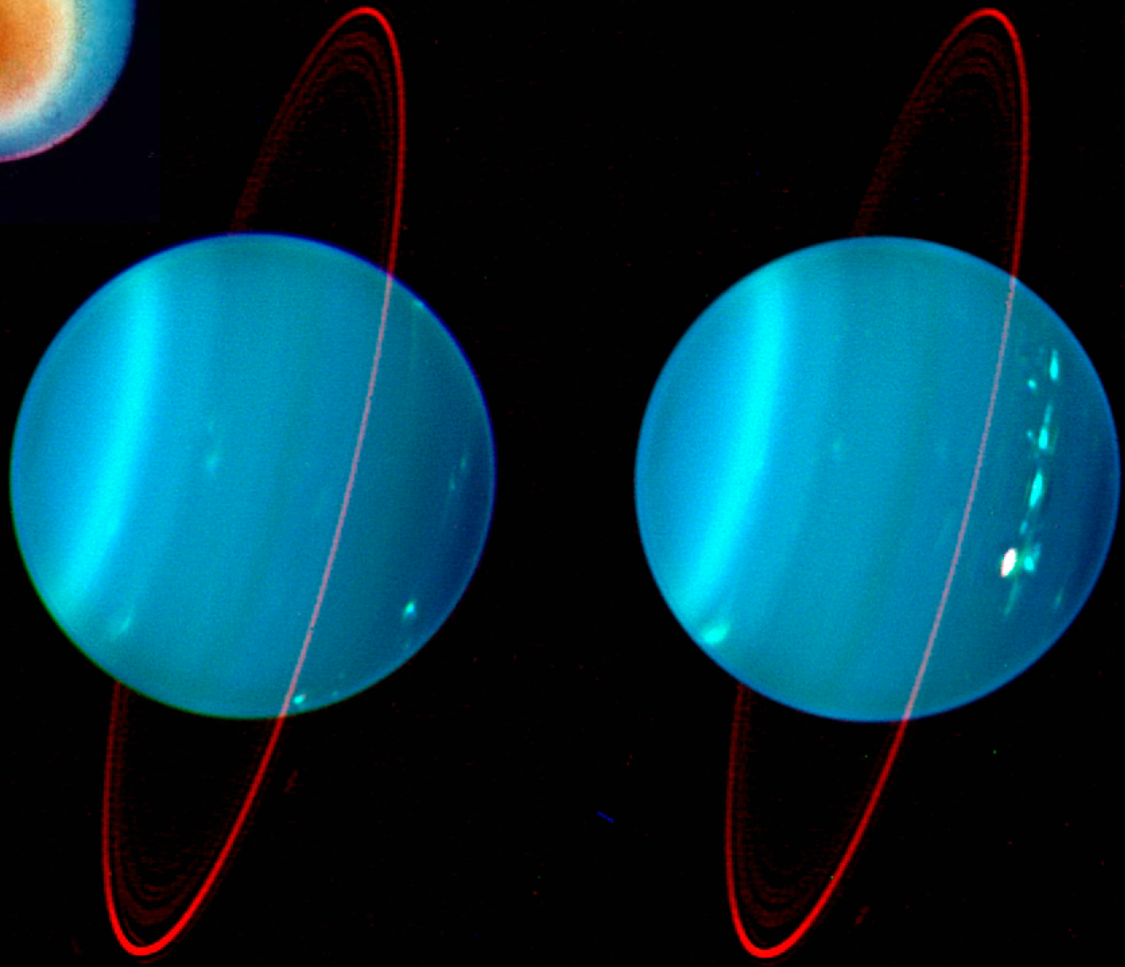
B

Urano



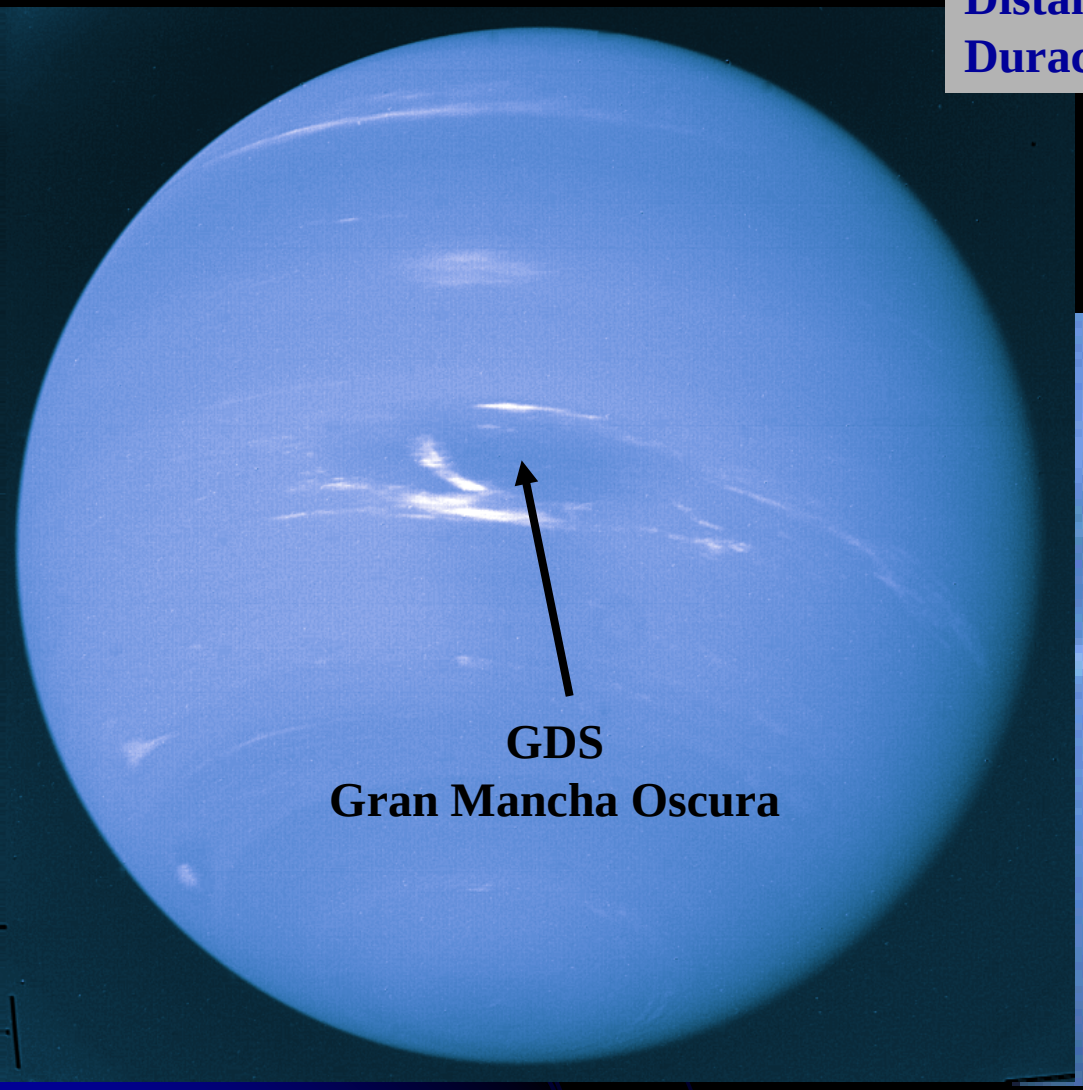
Eje inclinado 98º
Distancia: 2.875 millones km
Duración del año: 84 años terrestres



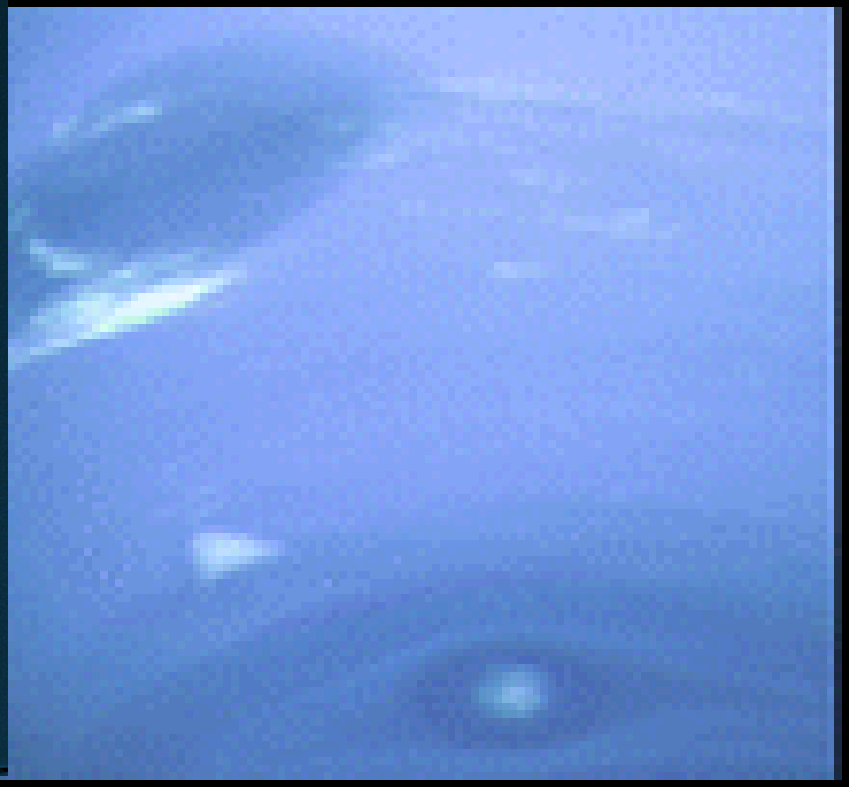


Neptuno

Calor Interno
Distancia: 4.500 millones de kms
Duración del año: 165 años terrestres

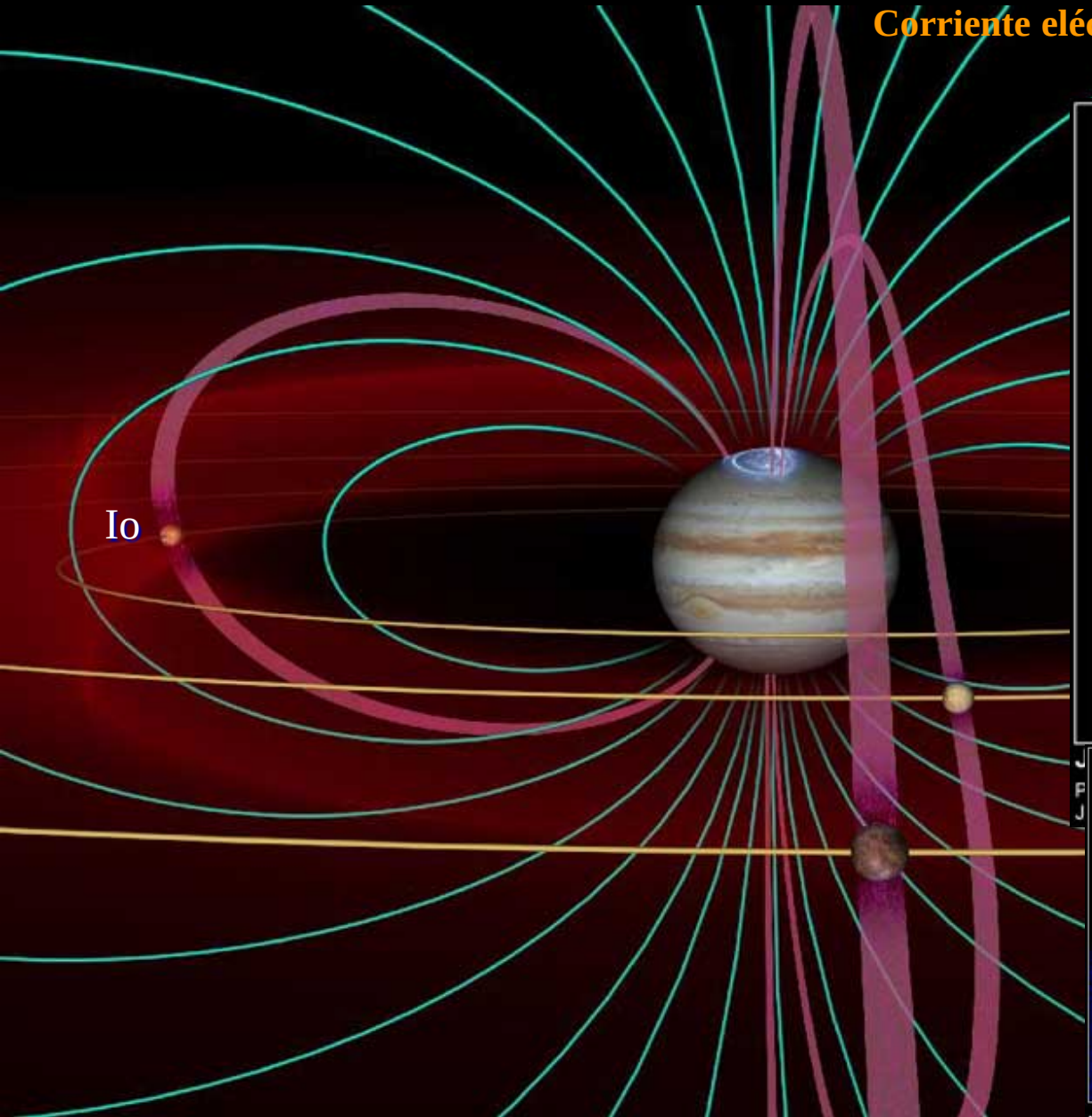


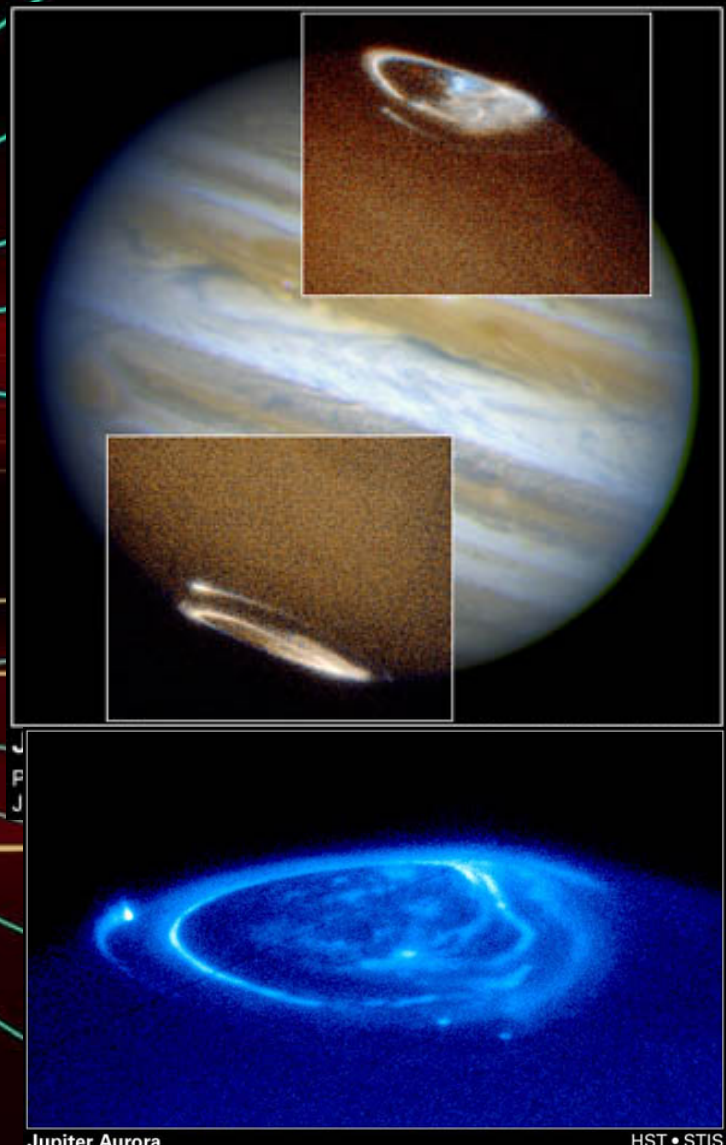
“Gran Mancha Oscura”



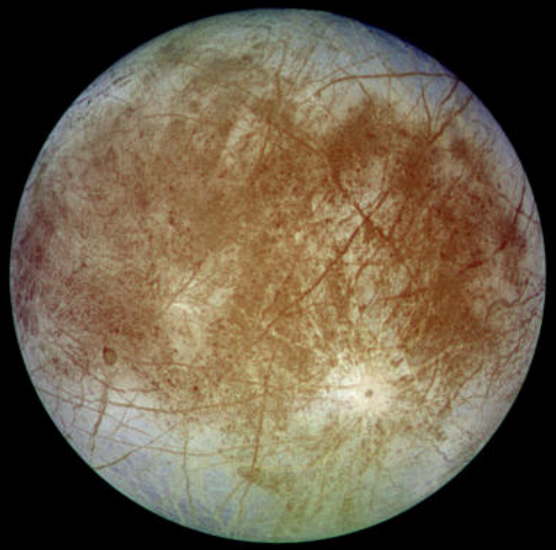
Júpiter : Ambiente electromagnético

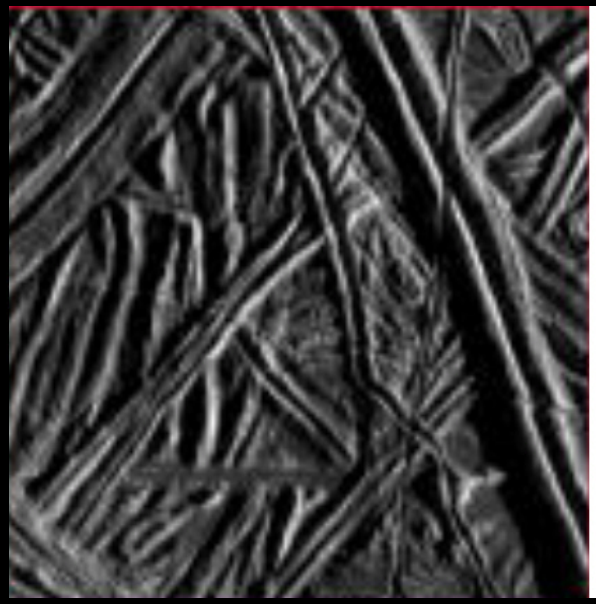
Corriente eléctrica de 1-3 millones amperios

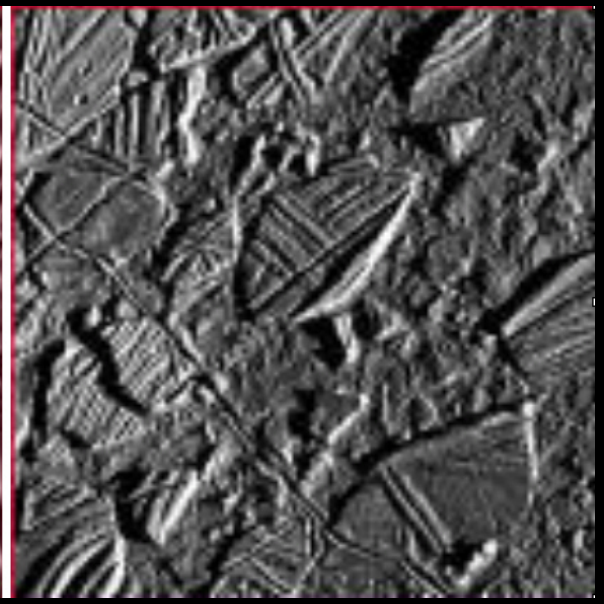


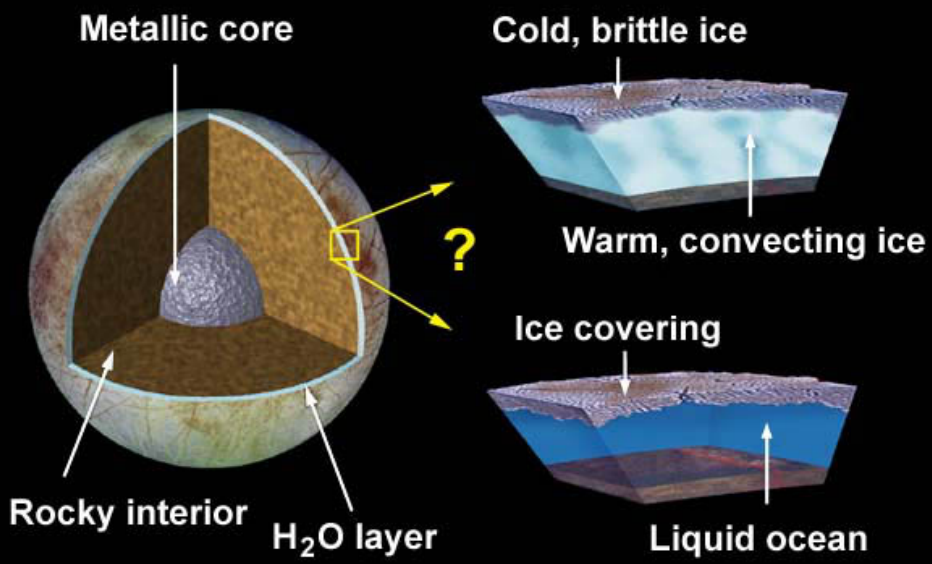


Satélite Europa de Júpiter: ¿Agua líquida bajo la superficie?



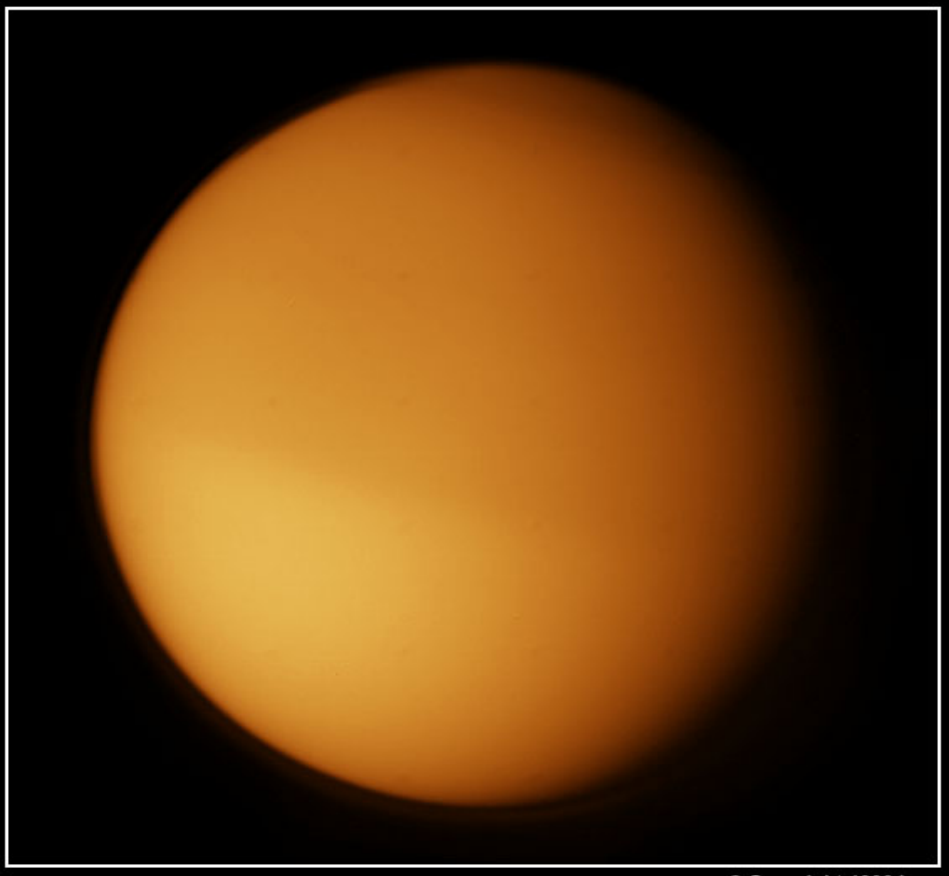




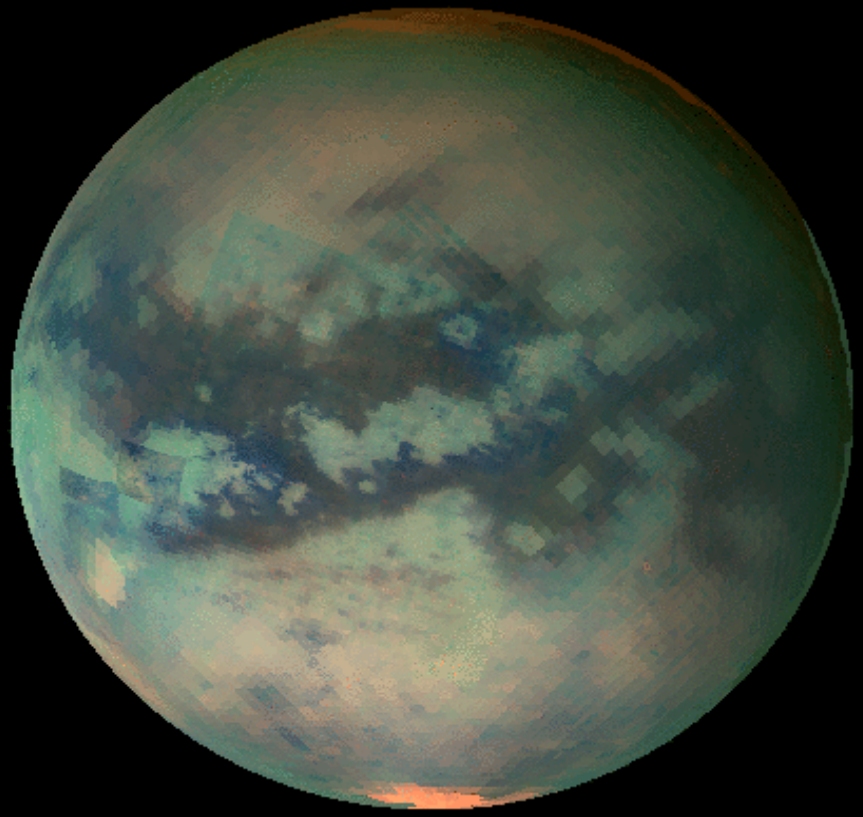


El satélite de Saturno Titán

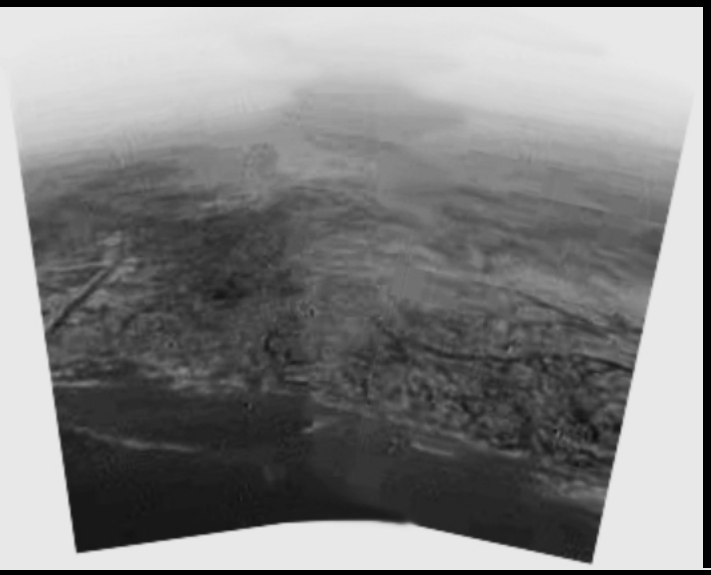
Atmósfera de Nitrógeno, Temperatura = -180˚C
Nieblas de hidrocarburos y nubes de metano

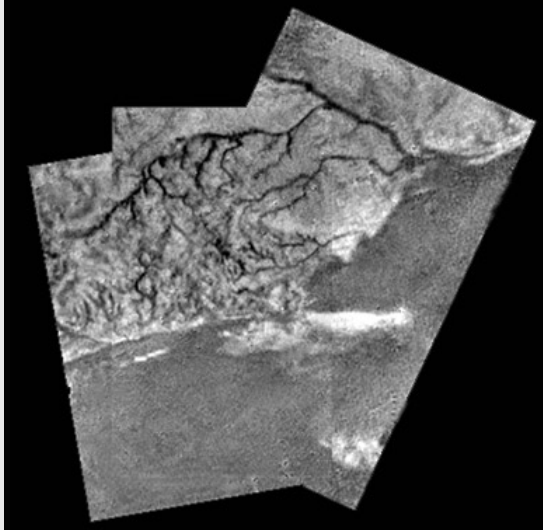


Titan

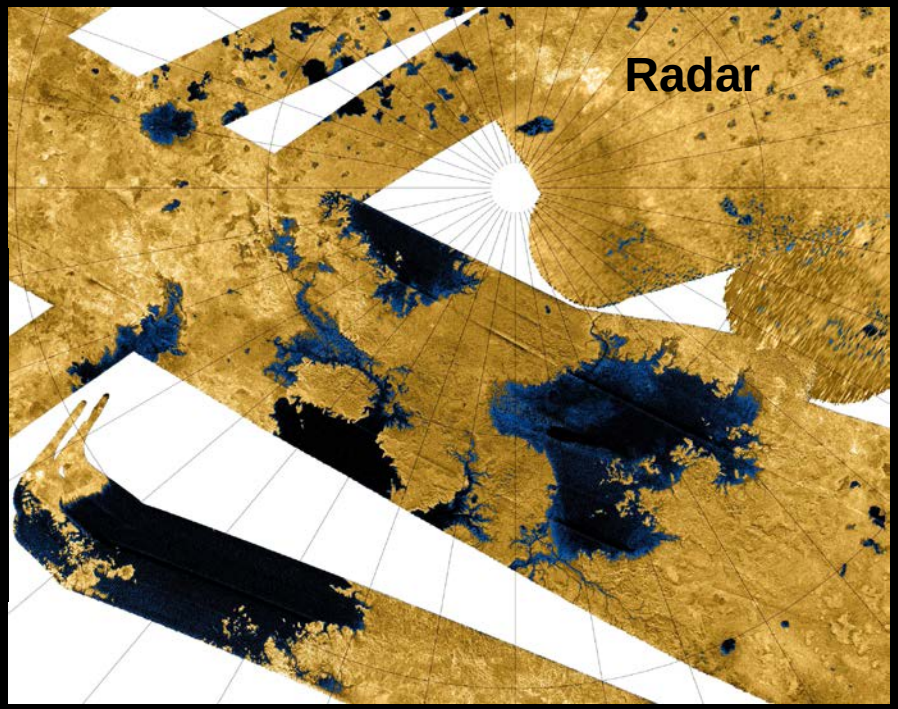


Titán: Descenso nave Huygens (14 Enero 2005)

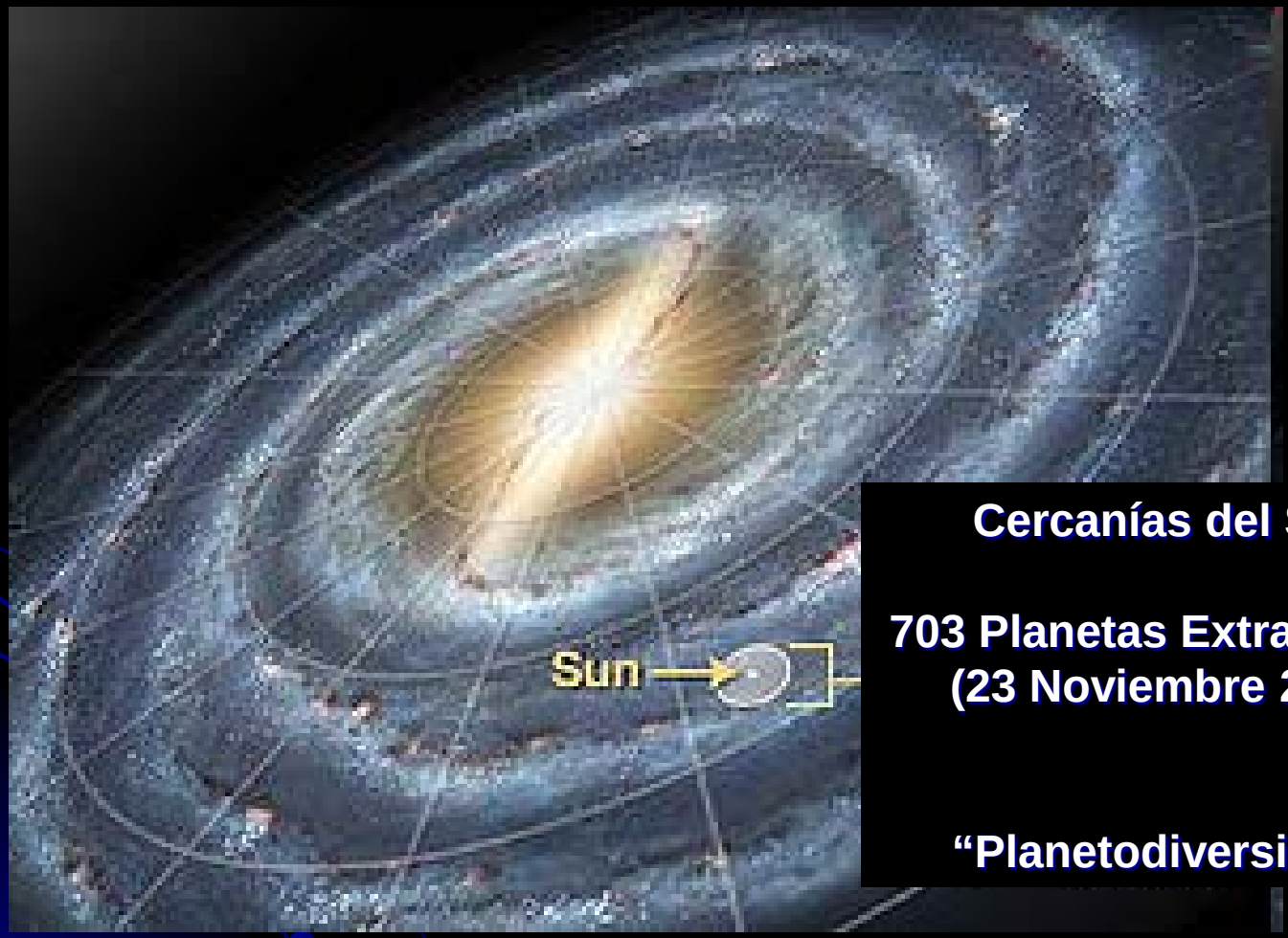




Nave Cassini



PLANETAS EXTRASOLARES



Cercanías del Sol:

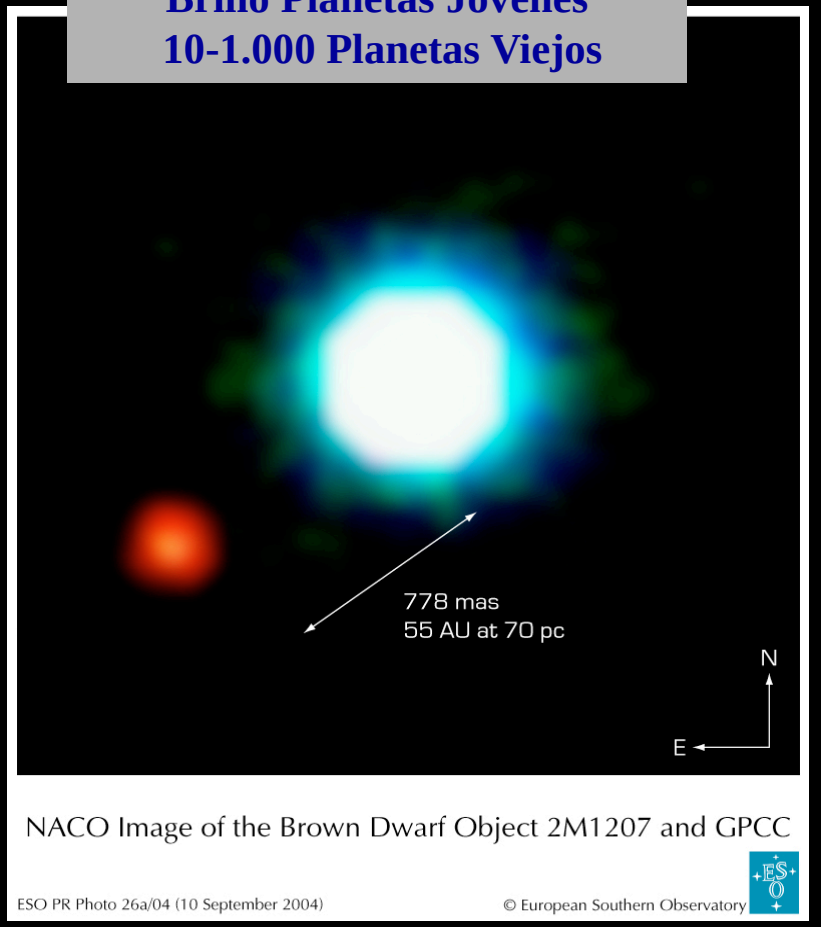
703 Planetas Extrasolares
(23 Noviembre 2011)

“Planetodiversidad”

Planetas extrasolares: Imagen directa

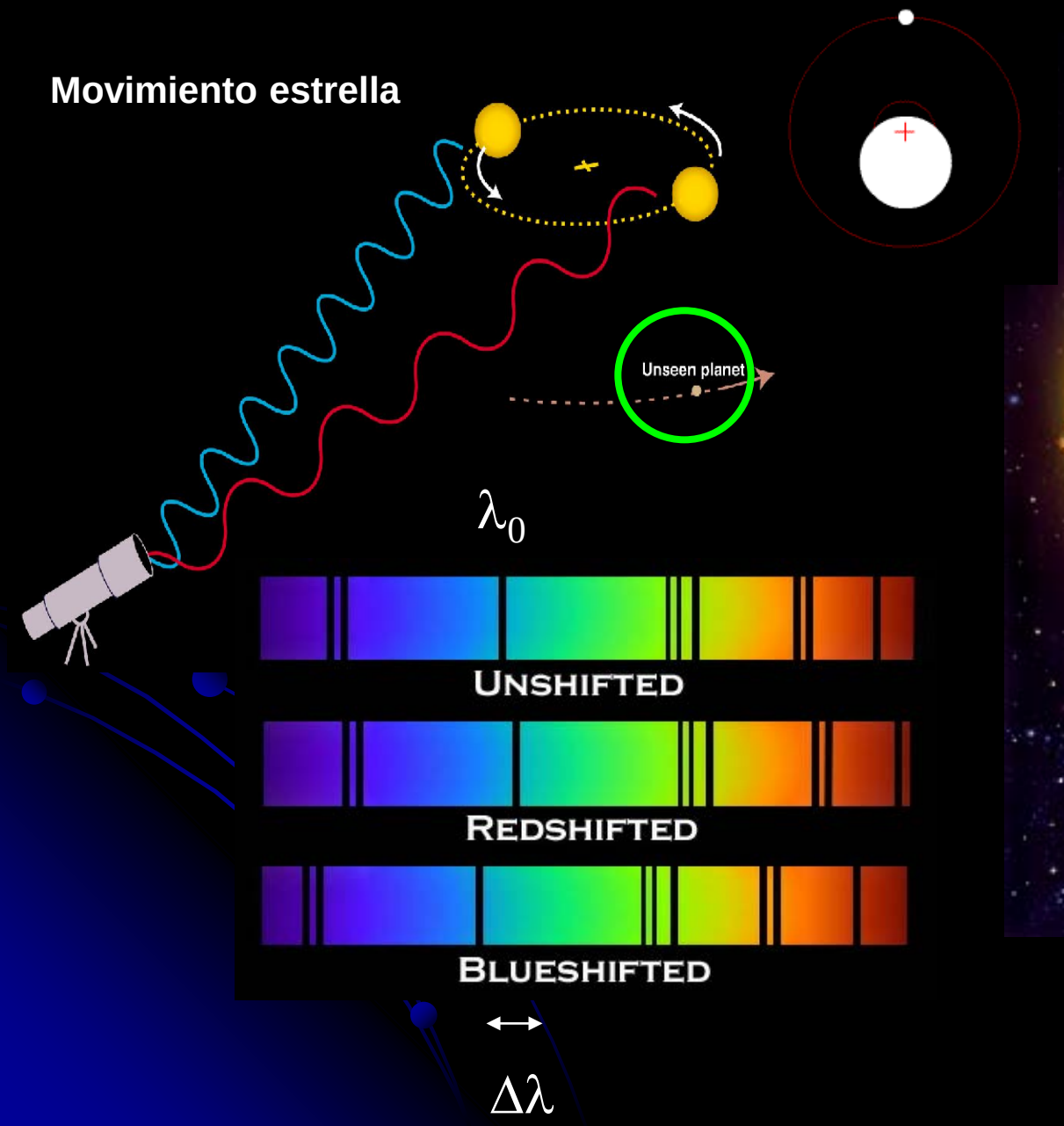
Brillo (Estrella / Planeta) ~ 10^6-10^{10}

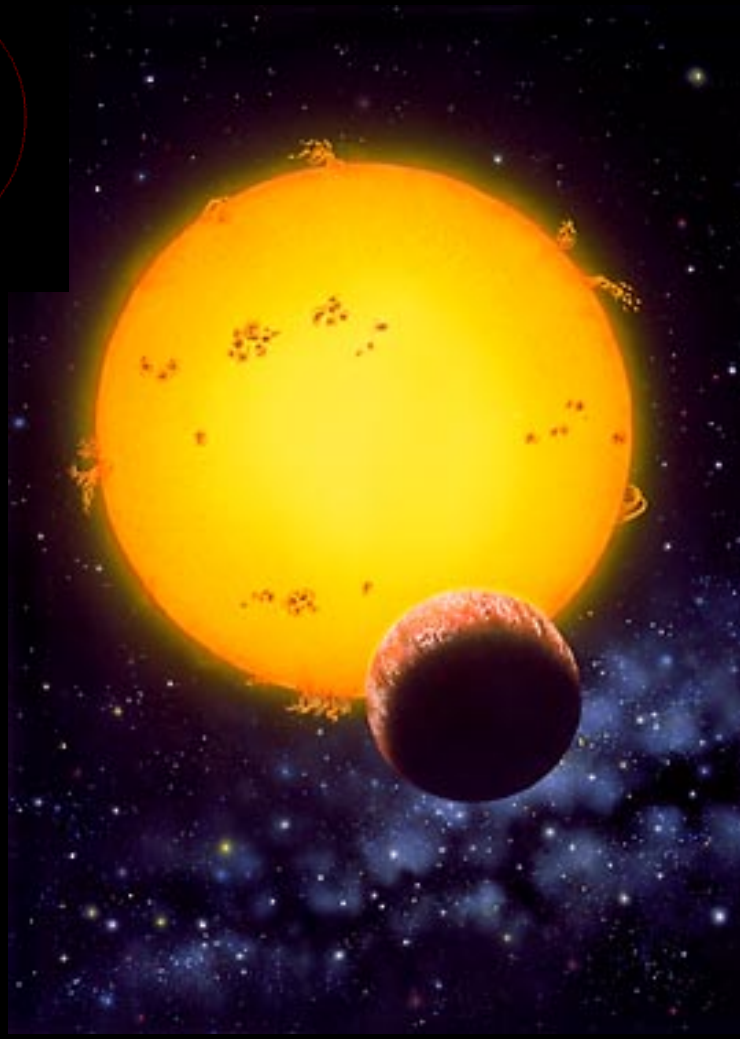
Brillo Planetas Jóvenes
10-1.000 Planetas Viejos



“Planetas”
Masa < 13 M(Júpiter) = 300 M (Tierra)

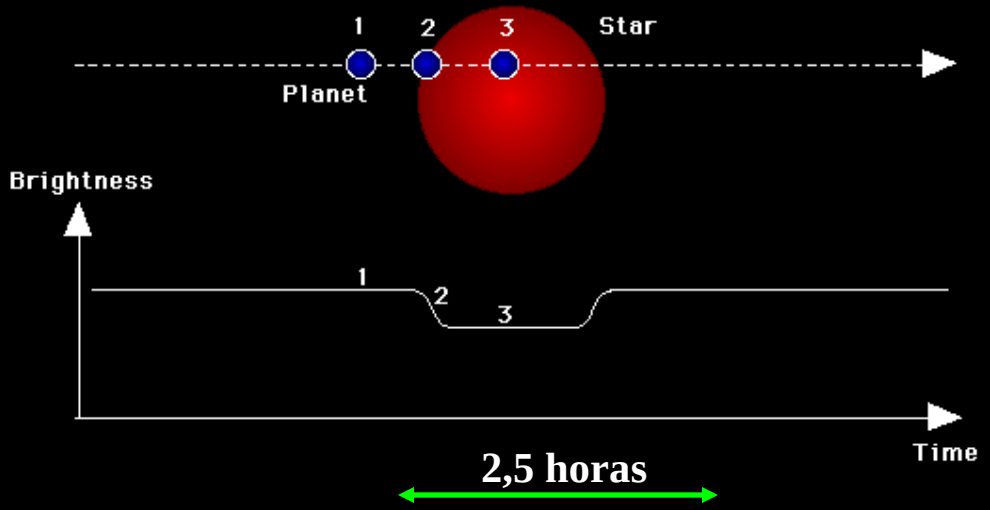
Detección por efecto Doppler





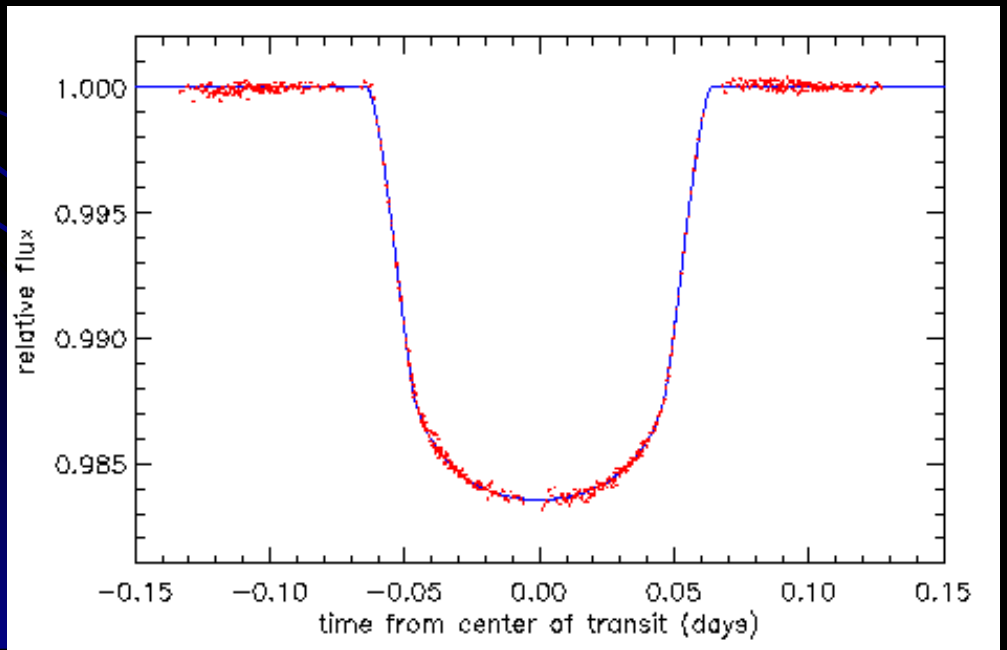
¡Planetas Gigantes
a solo 3 millones kms!

Planetas eclipsantes

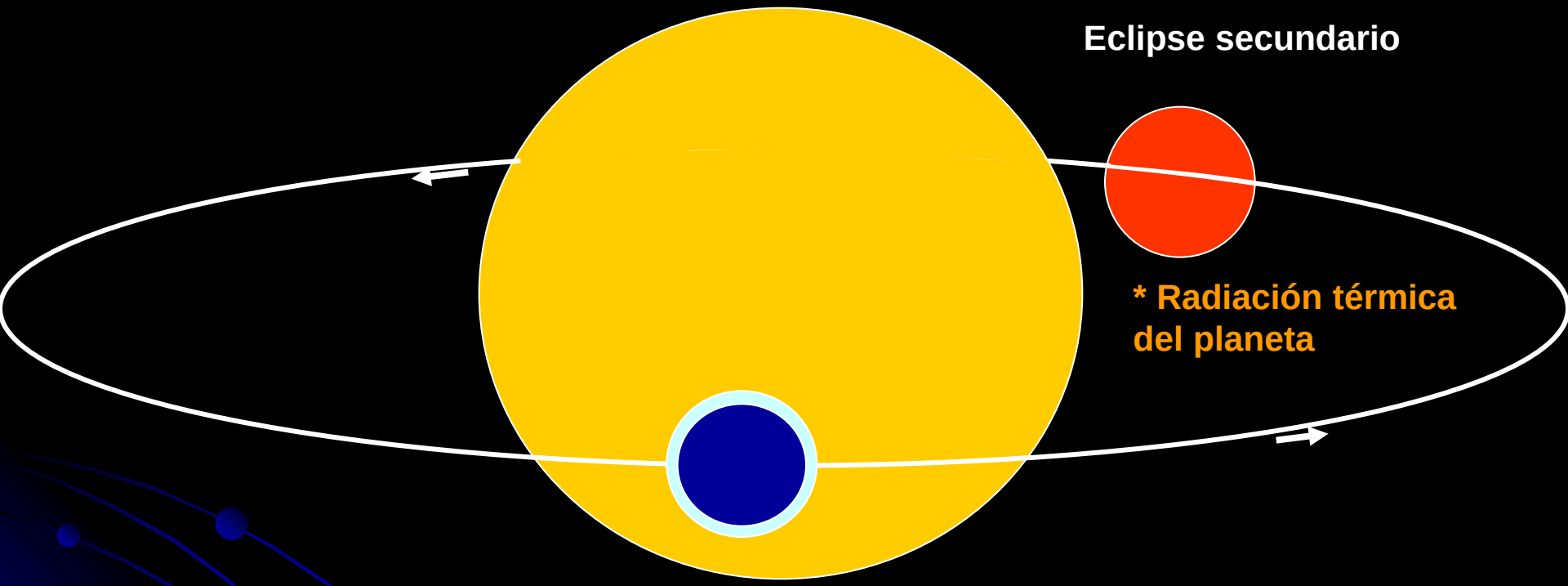


Períodos orbitales
= 1 - 5 días

Distancias Planeta – Estrella
= 3 - 7 millones de kms



Tránsitos y Eclipses



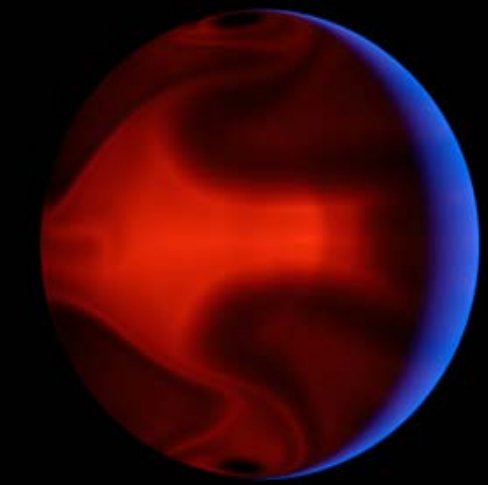
- Radiación de la estrella bloqueada

* Radiación de la estrella atraviesa la atmósfera planeta

“Planetodiversidad”

Planetas Nacientes
(10 millones de años)

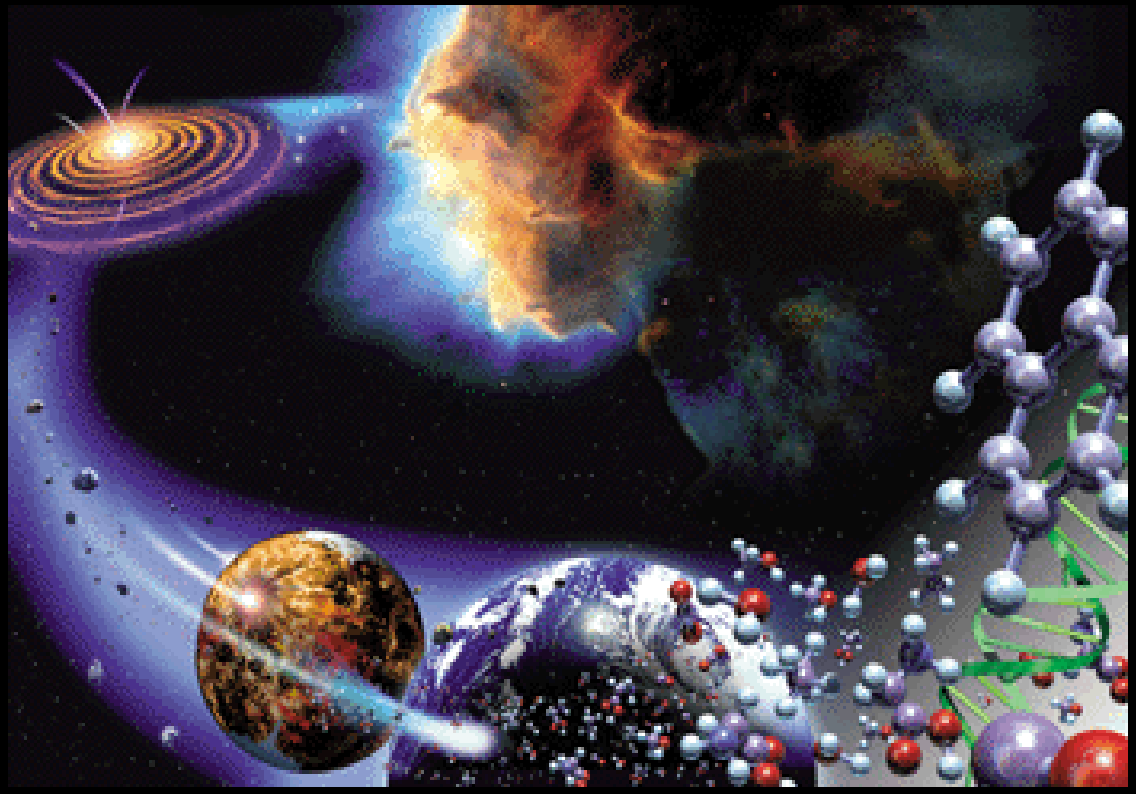
Super-Tierras
(10 M_T – 2 R_T)

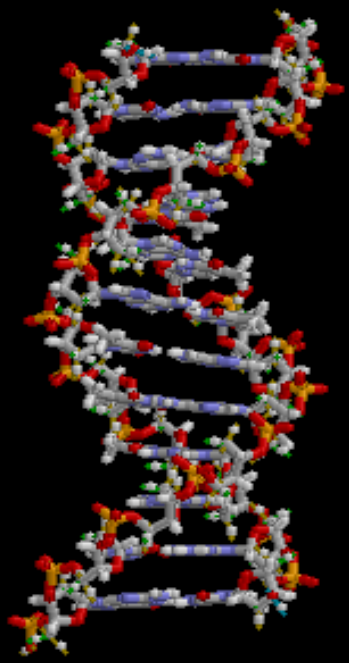


Júpiter Calientes
(T = 2.000 ºC)
(V = 3.600 km/hr)

Planetas
Oceánicos
(15 M_T - 5 R_T)

¿Hay vida en otros rincones del Universo?





Fuente de energía + Agua líquida + Carbono
+ "condiciones apropiadas" =
Macromoléculas orgánicas → célula

("Un planeta, un experimento", Edward O. Wilson, biólogo)

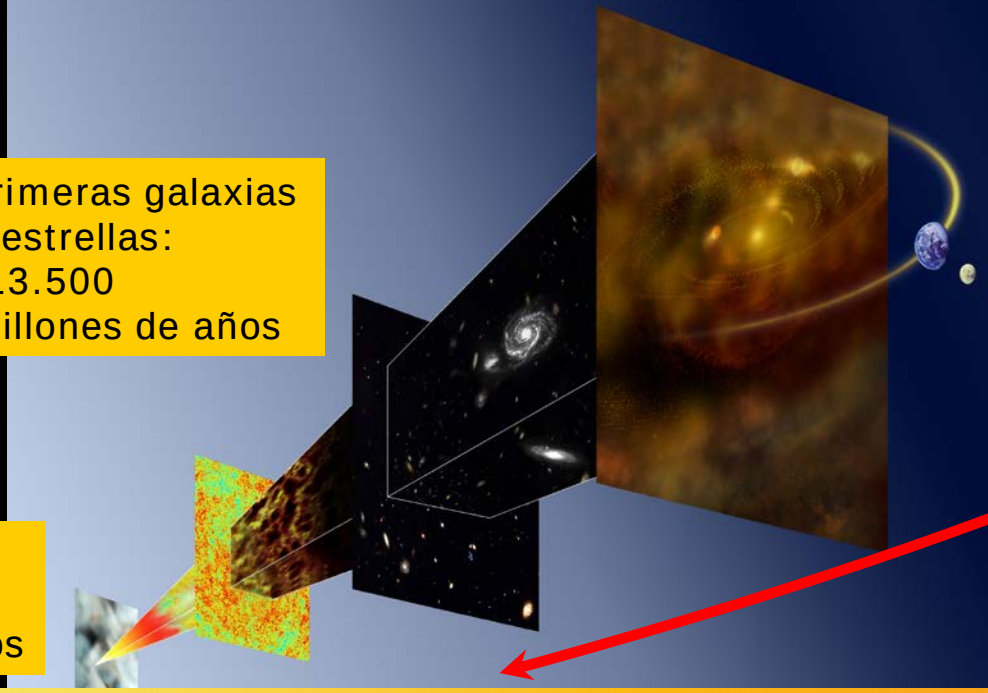
Evolución y vida en el Universo

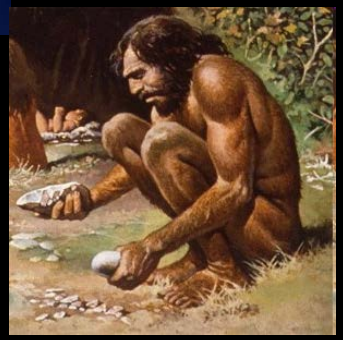
("El cambio es la única cosa en el Universo que no cambia", Helmuth Wilhem, filólogo)

Primeras galaxias y estrellas: -13.500 millones de años

Formación Sistema Solar -4.650 millones de años

"Big Bang" -13.750 millones de años





-3.500 millones años

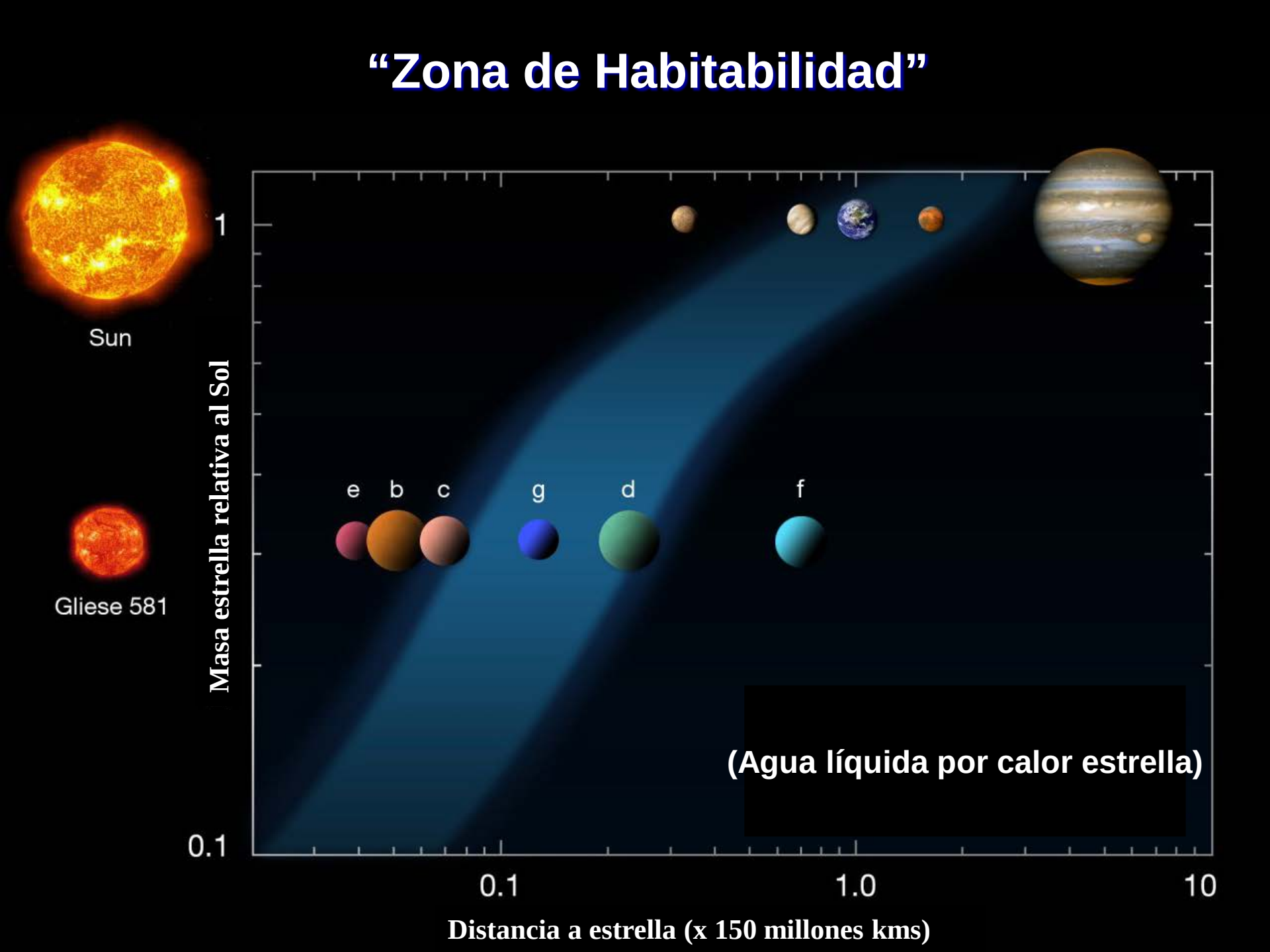
-6 millones de años

-500 millones de años

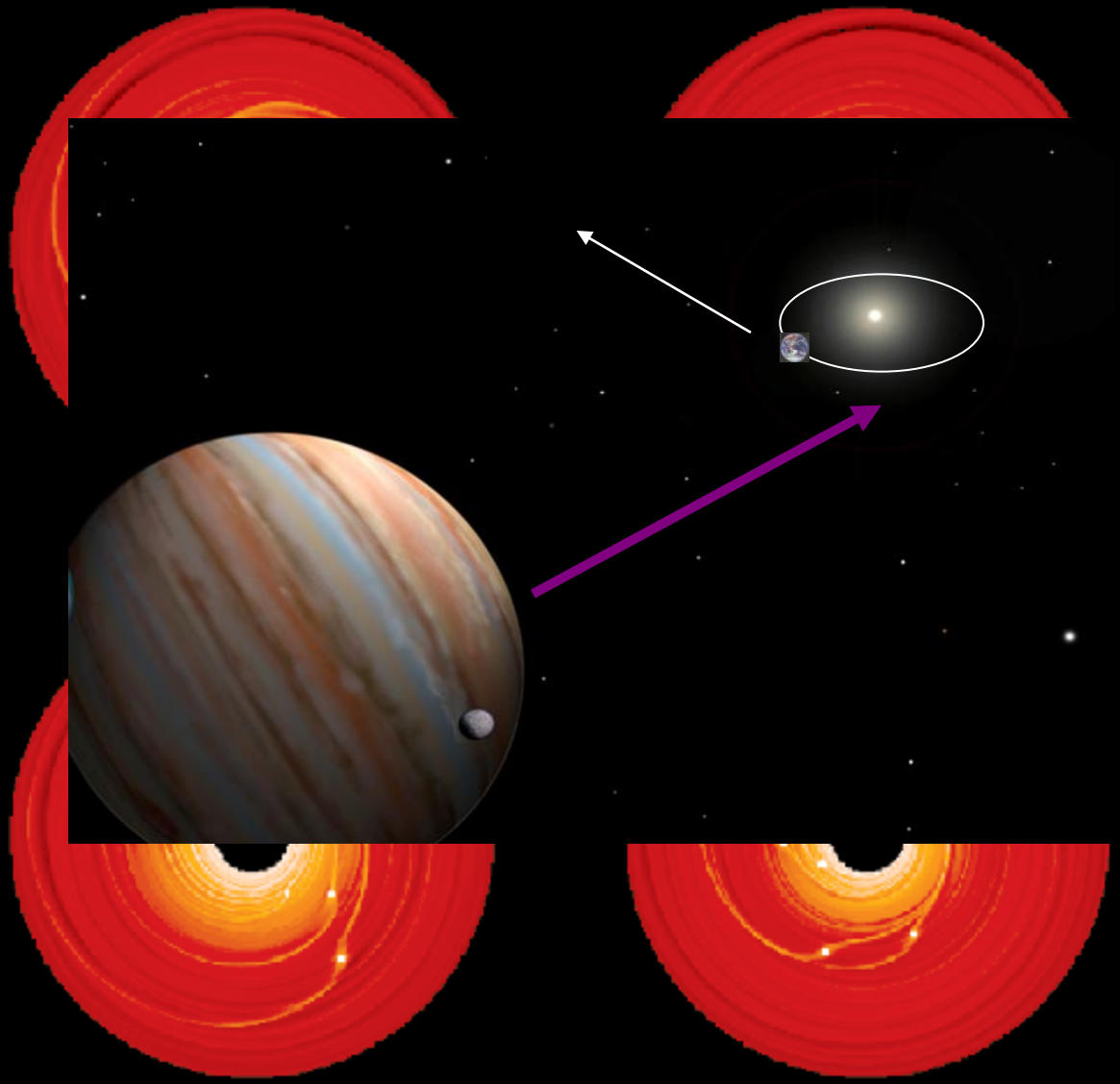
-150.000 años

("El hombre es un pedazo del Universo hecho vida" Ralph W. Emerson, escritor y filósofo)

“Zona de Habitabilidad”



Planetas gigantes: Migraciones peligrosas



¿Estamos solos en el Universo?

(El Roto, El País 29 Diciembre 2005)

“Si estamos solos en el Universo, seguro que sería una terrible pérdida de espacio”

(Carl Sagan, planetólogo)

“A veces pienso que la prueba más fehaciente de que existe vida inteligente en el Universo es que nadie ha intentado contactar con nosotros” (Bill Watterson, dibujante cómico)

¿Hay vida “inteligente” más allá de la Tierra?

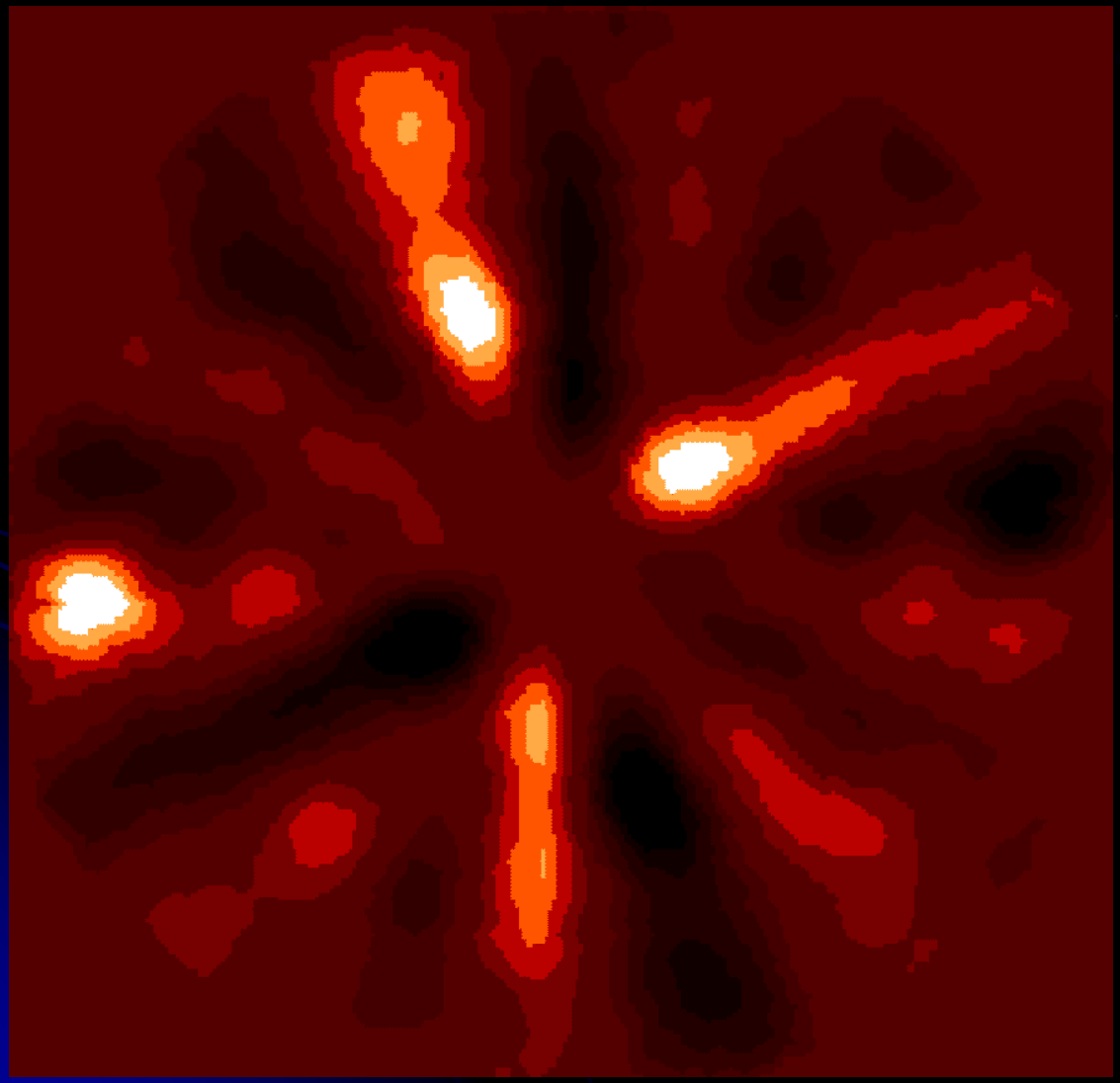
Recibir – Enviar señales de radio (λ = 3-35 cm)

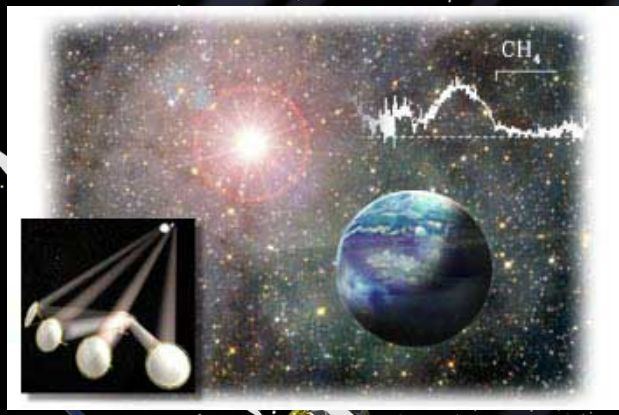
SETI

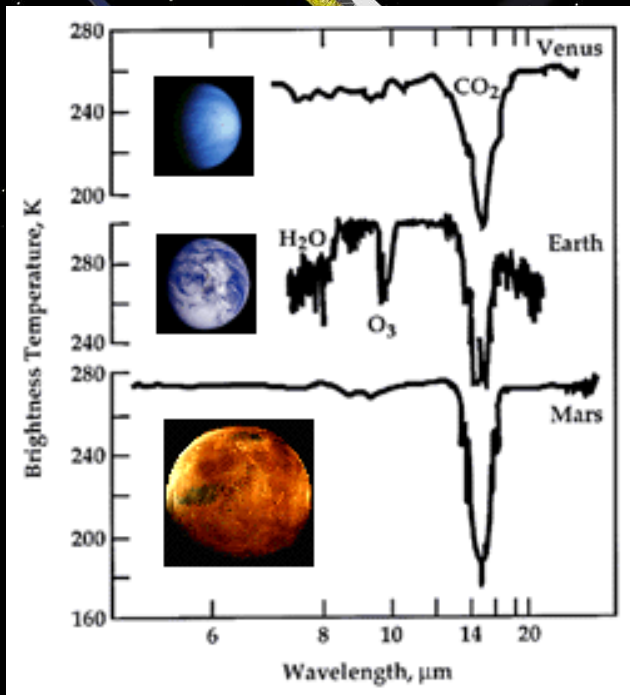
El futuro: Telescopios Interferométricos

El Sistema Solar vista desde 32 años luz

TPF (NASA) - Darwin (ESA)







Quizás en un futuro muy lejano…