
CDA

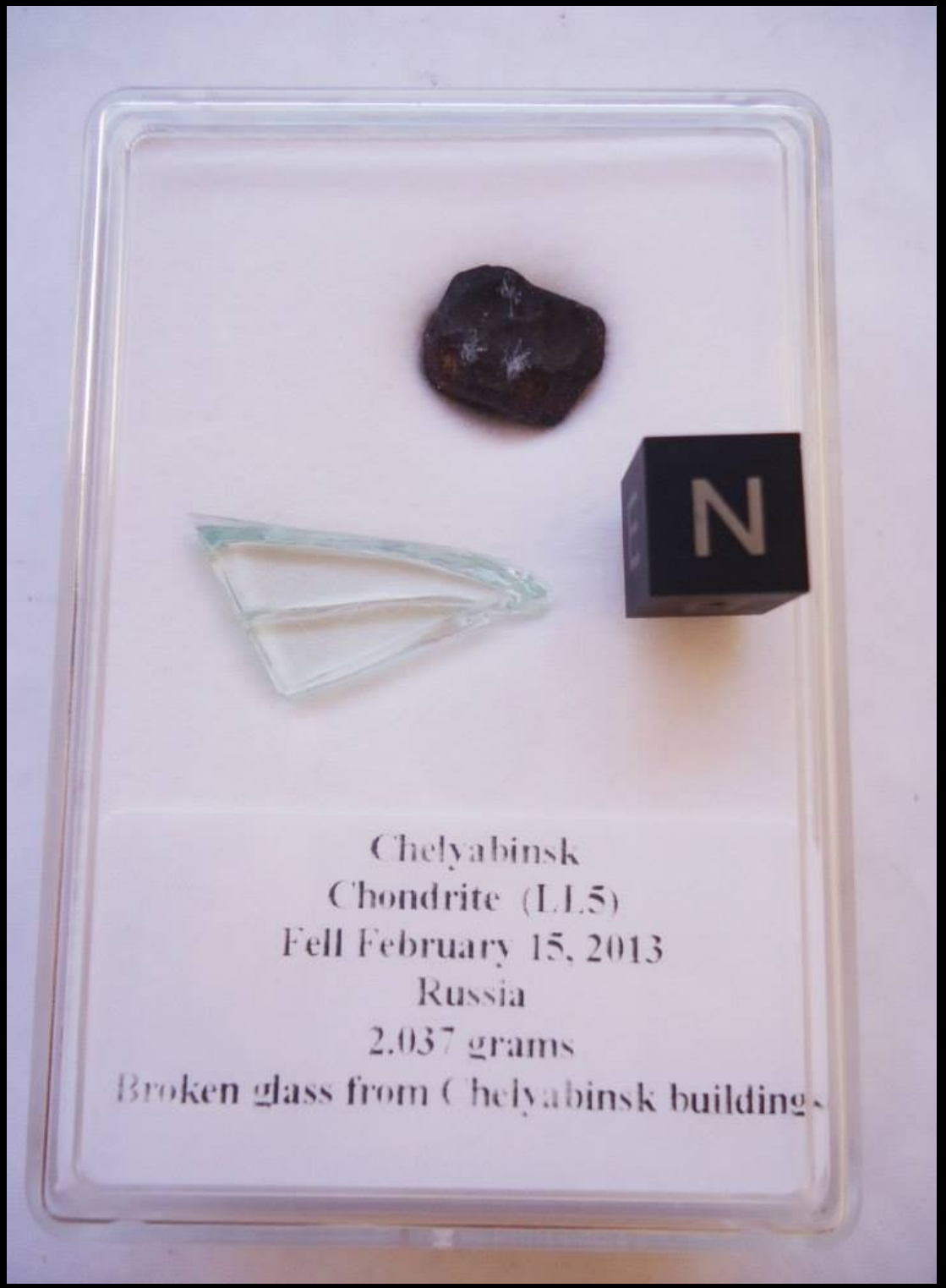

Sessão Astronomia

Próximas Sessões Astronomia		
10/08	Eta Carinae	Bruna
24/08	O Folclore na Astronomia	Andrea
31/08	O Cometa Ison	Karen
14/08	Programa Voyager	Robson

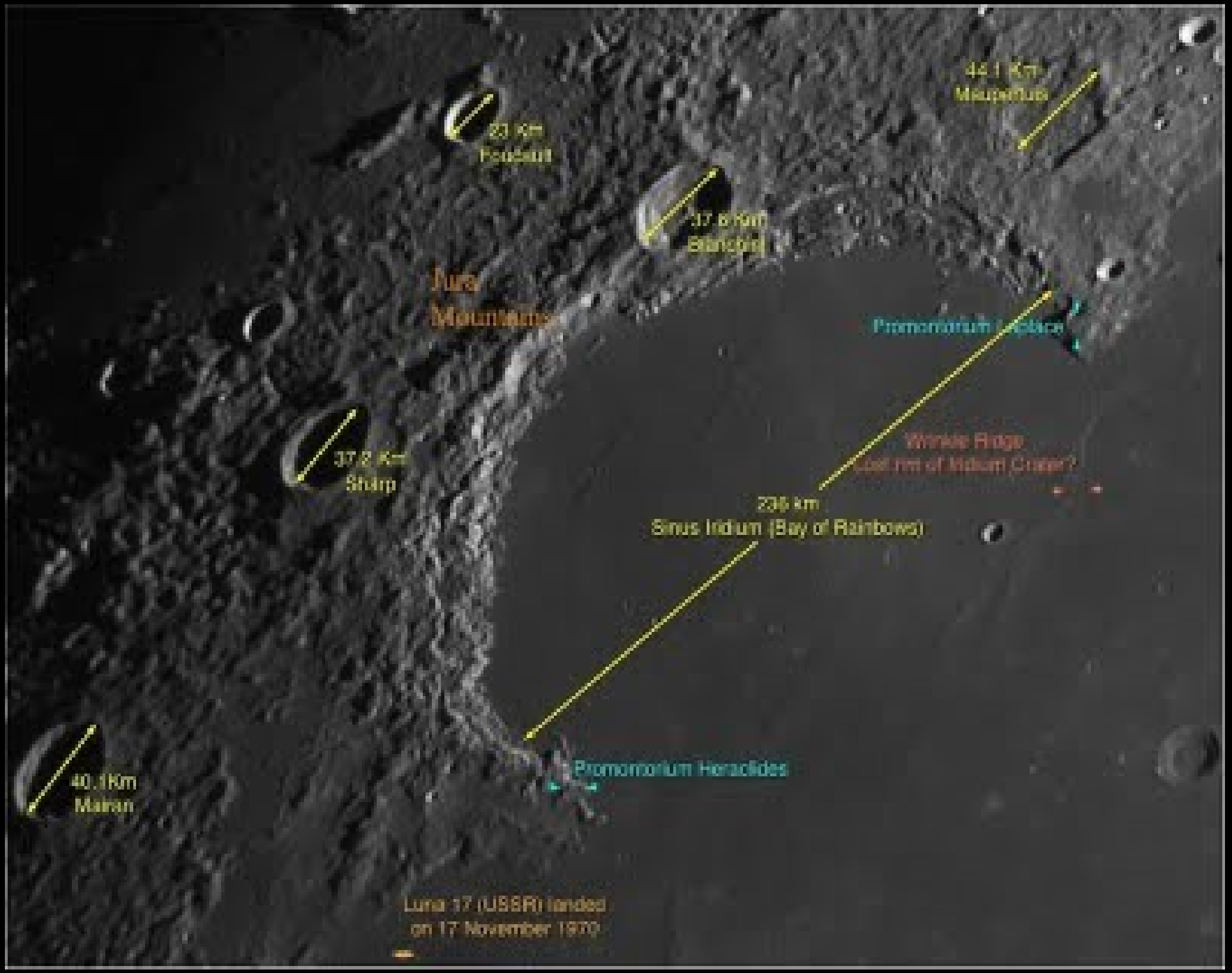

Distâncias Astronômicas

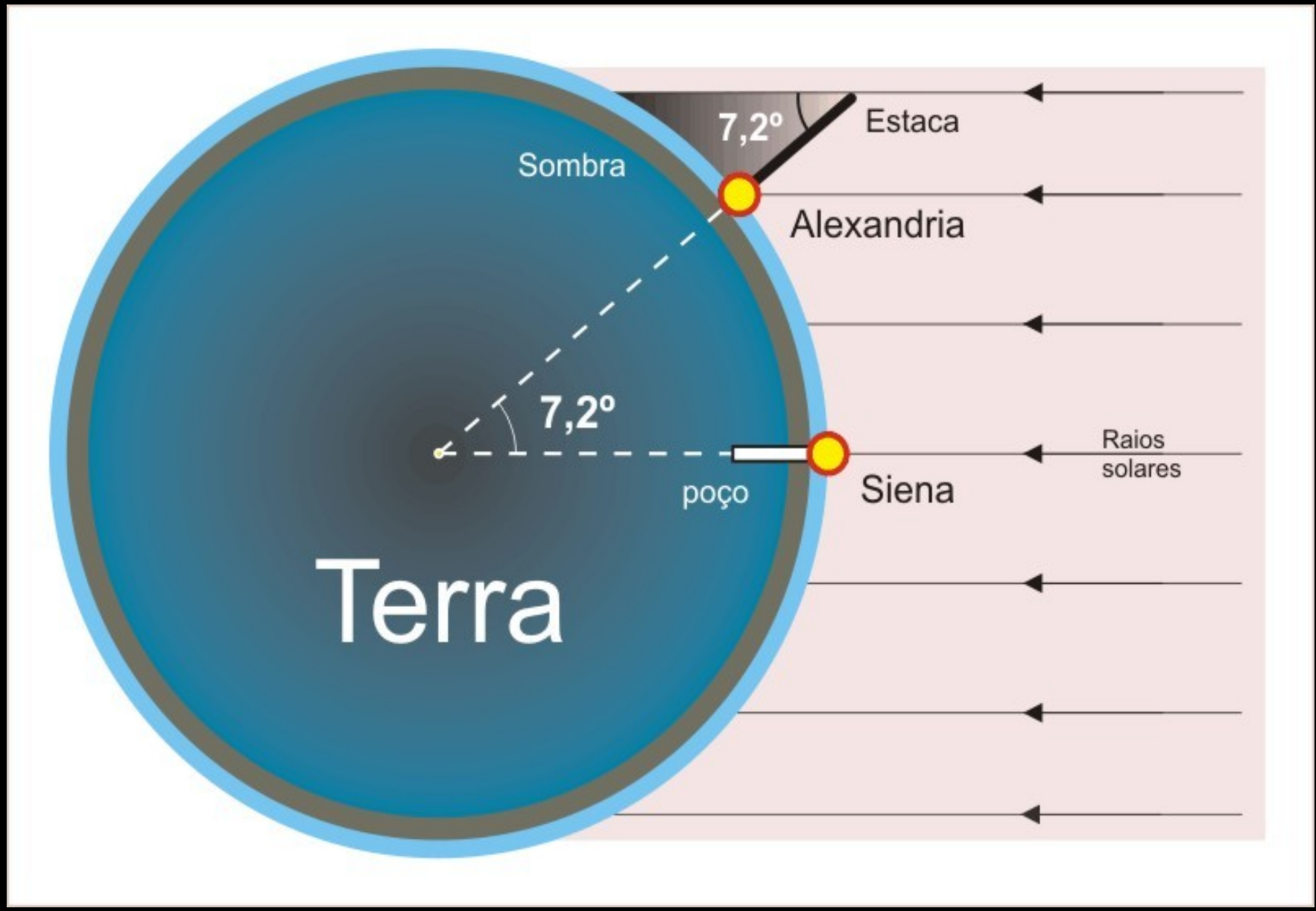
Medidas que usamos diariamente:

Milímetro, Centímetro, Metro e Quilômetro


N
Chelyabinsk
Chondrite (LL5)
Fell February 15, 2013
Russia
2.037 grams
Broken glass from Chelyabinsk building

Meteorito Brenham
Kiowa County, Kansas - EUA - 1882
Ferro-rochoso - Palasito - (achado)


44.1 Km
Mauvilus
23 Km
Foucault
37.6 Km
Billingh
Jura
Mountains
Promontorium Laplace
37.2 Km
Stolp
Wrinkle Ridge
Lost rim of Milium Crater?
235 km
Sinus Iridum (Bay of Rainbows)
Promontorium Heraclides
40.1Km
Maraldi
Luna 17 (USSR) landed
on 17 November 1970


7,2º
Estaca
Sombra
Alexandria
7,2º
Raios
solares
poço
Siena
Terra

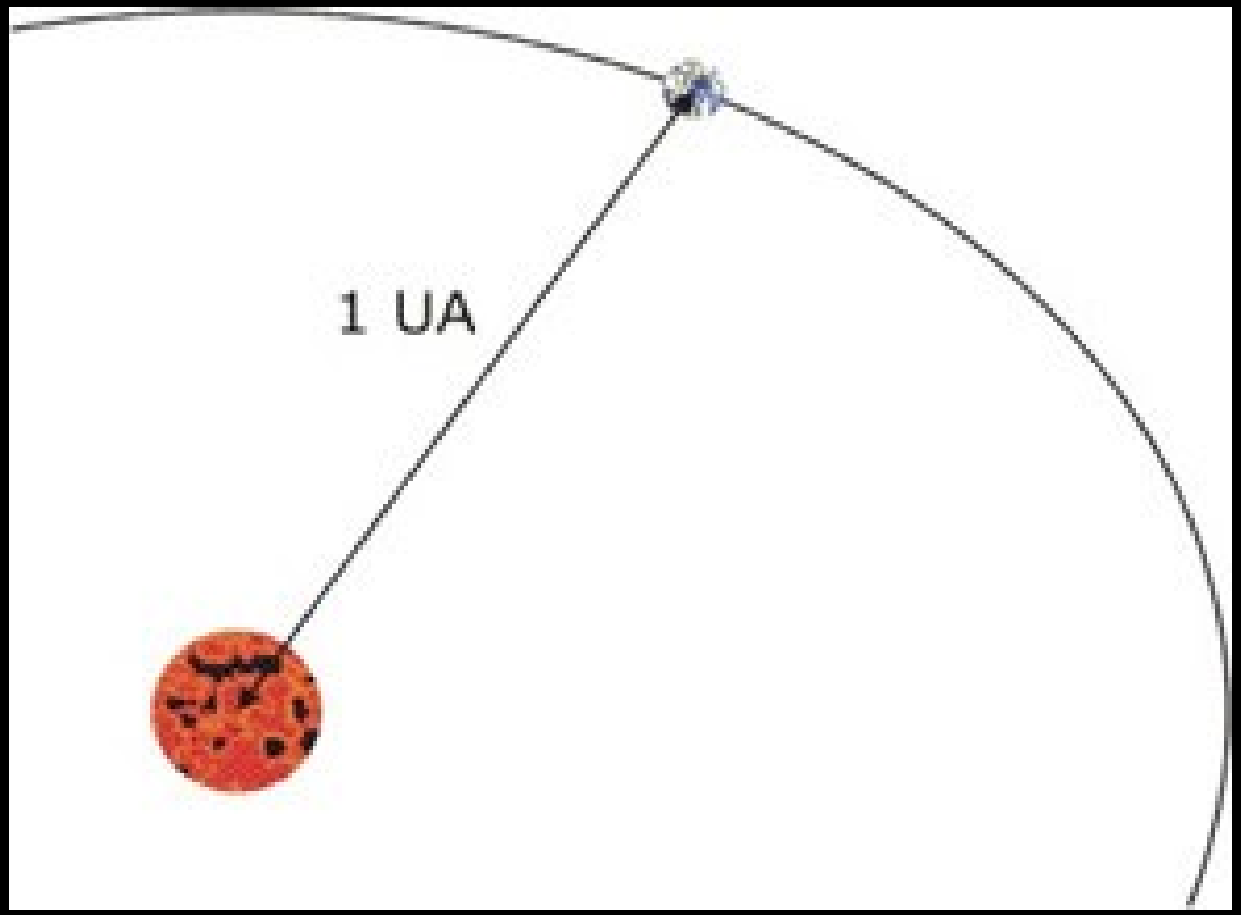
Medidas em 21 de junho por volta de 200 a.C:

Em Siena não há sombra de uma estaca ao meio-dia, em Alexandria a sombra produz um ángulo de 7,2º com a estaca na vertical. Eratóstenes sabia que a distância entre as cidades era de cerca de 800 km e então pensou: 7° = 1/50 da circunferência (360°) e isso corresponde a cerca de 800 km.
Oitocentos quilômetros vezes cinqüenta são 40.000 km, de modo que deve ser este o valor da circunferência da Terra.

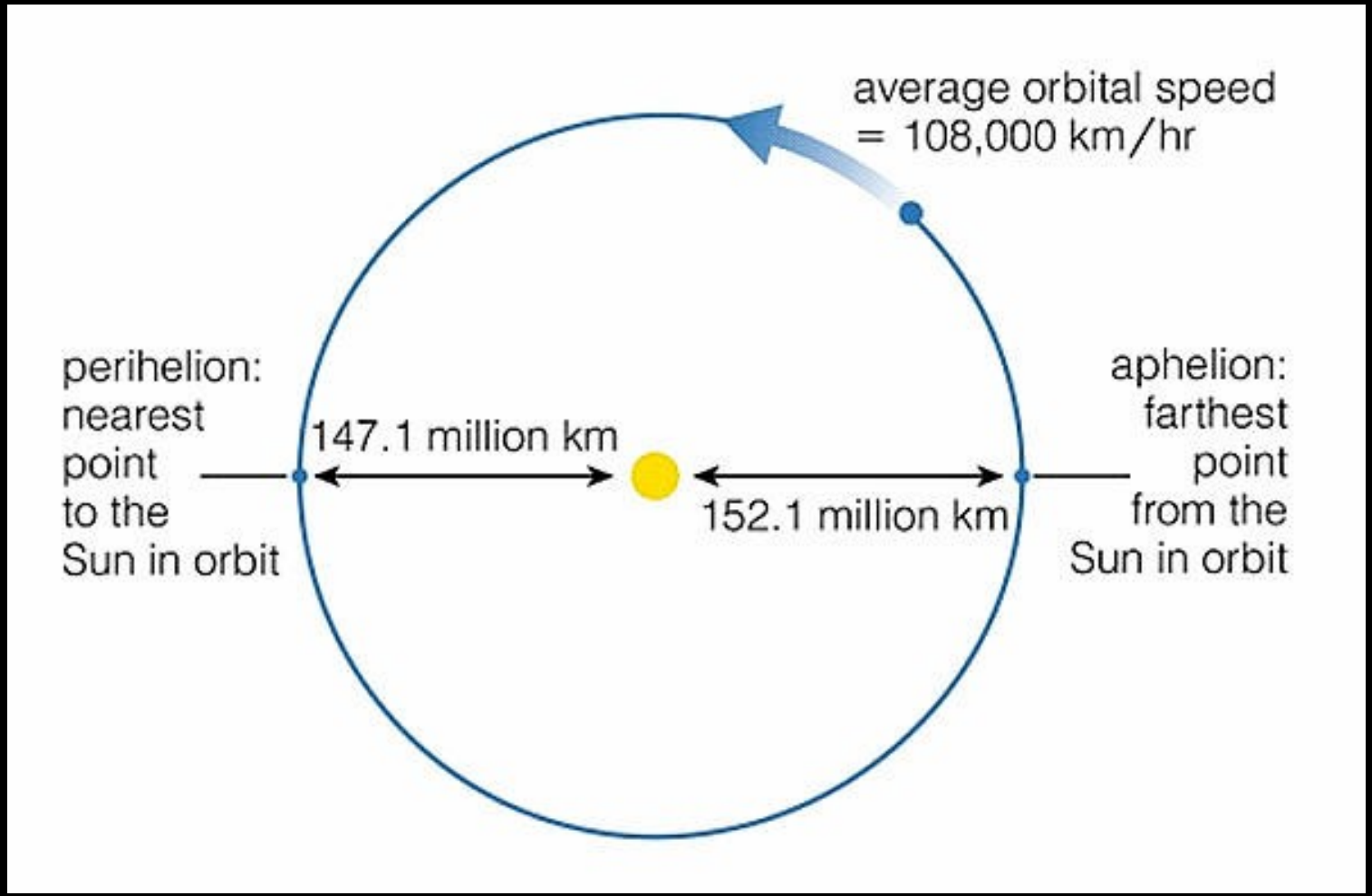
VALOR ENCONTRADO ATUALMENTE: cerca de 40.072 km ao longo da linha do equador.

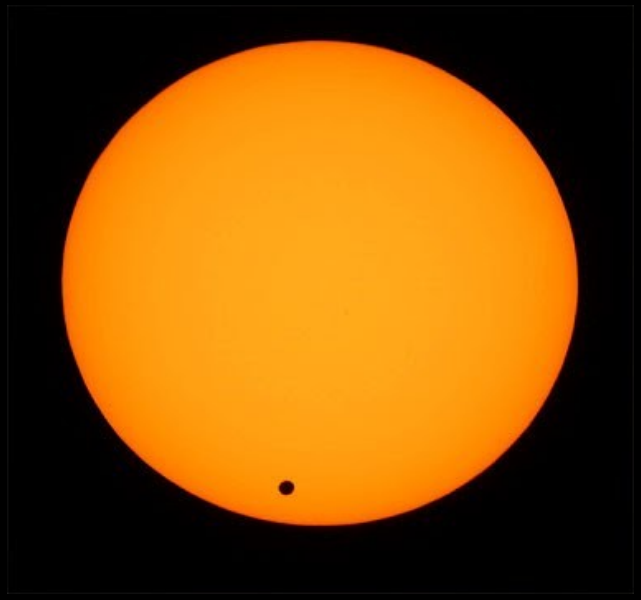
Todas as unidades de medida que utlizamos diariamente são pequenas perto da maioria das medidas astronômicas.

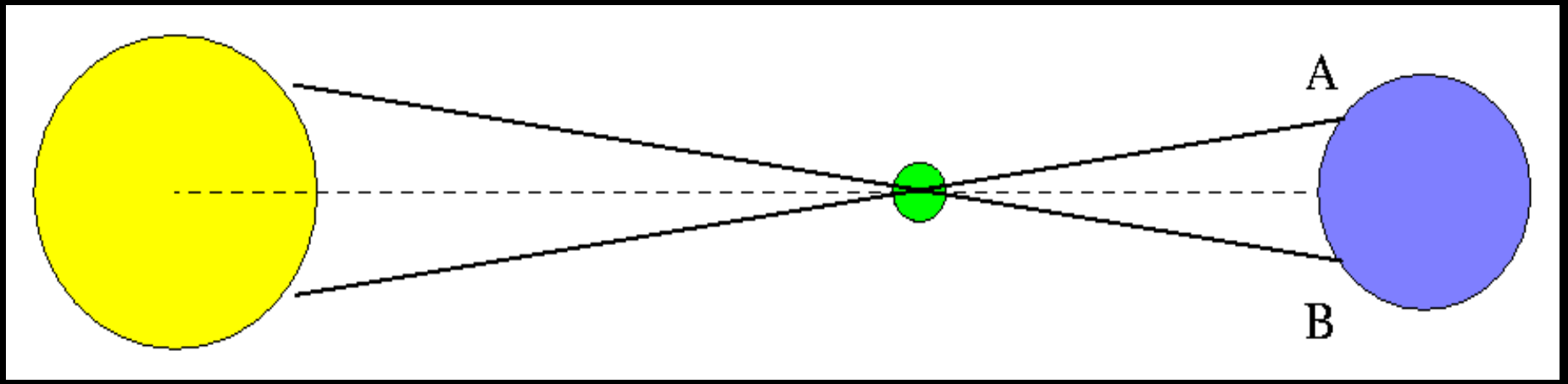
Unidade Astronômica (UA ou AU)

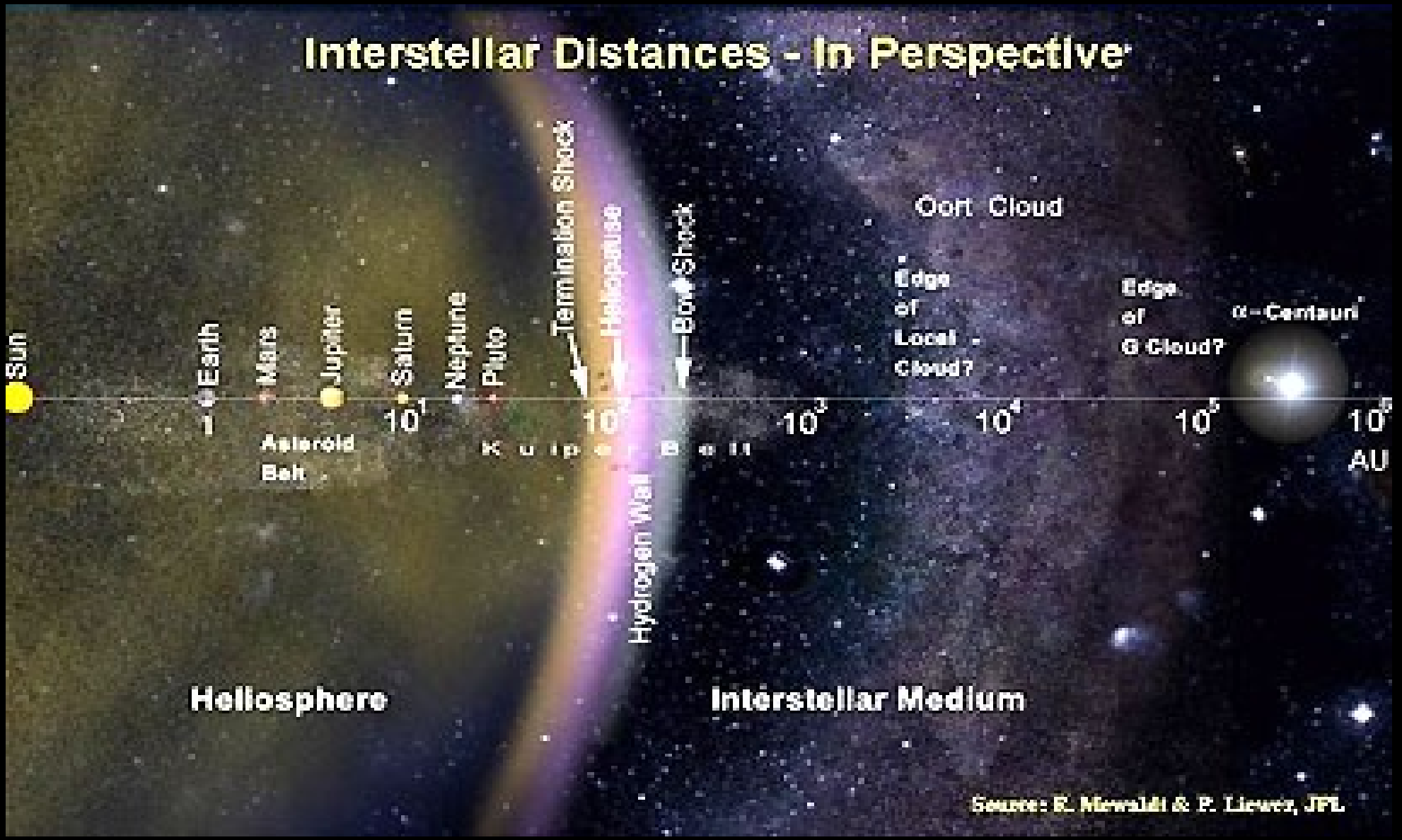


149 597 871 km


average orbital speed
= 108,000 km/hr
perihelion:
nearest
point
to the
Sun in orbit
147.1 million km
152.1 million km
aphelion:
farthest
point
from the
Sun in orbit




A
B


Interstellar Distances - In Perspective
Sun
Earth
Mars
Jupiter
Saturn
Neptune
Pluto
Asteroid Belt
Kuiper Belt
Termination Shock
Heliopause
Bow Shock
Hydrogen Wall
Oort Cloud
Edge of Local Cloud?
Edge of G Cloud?
α-Centauri
1
10^1
10^2
10^3
10^4
10^5
10^6
AU
Heliosphere
Interstellar Medium
Source: E. Mewaldt & P. Liewer, JPL

Ano Luz (ly)

Velocidade da luz: 300.000 km/segundo

1 minuto = 60 segundos

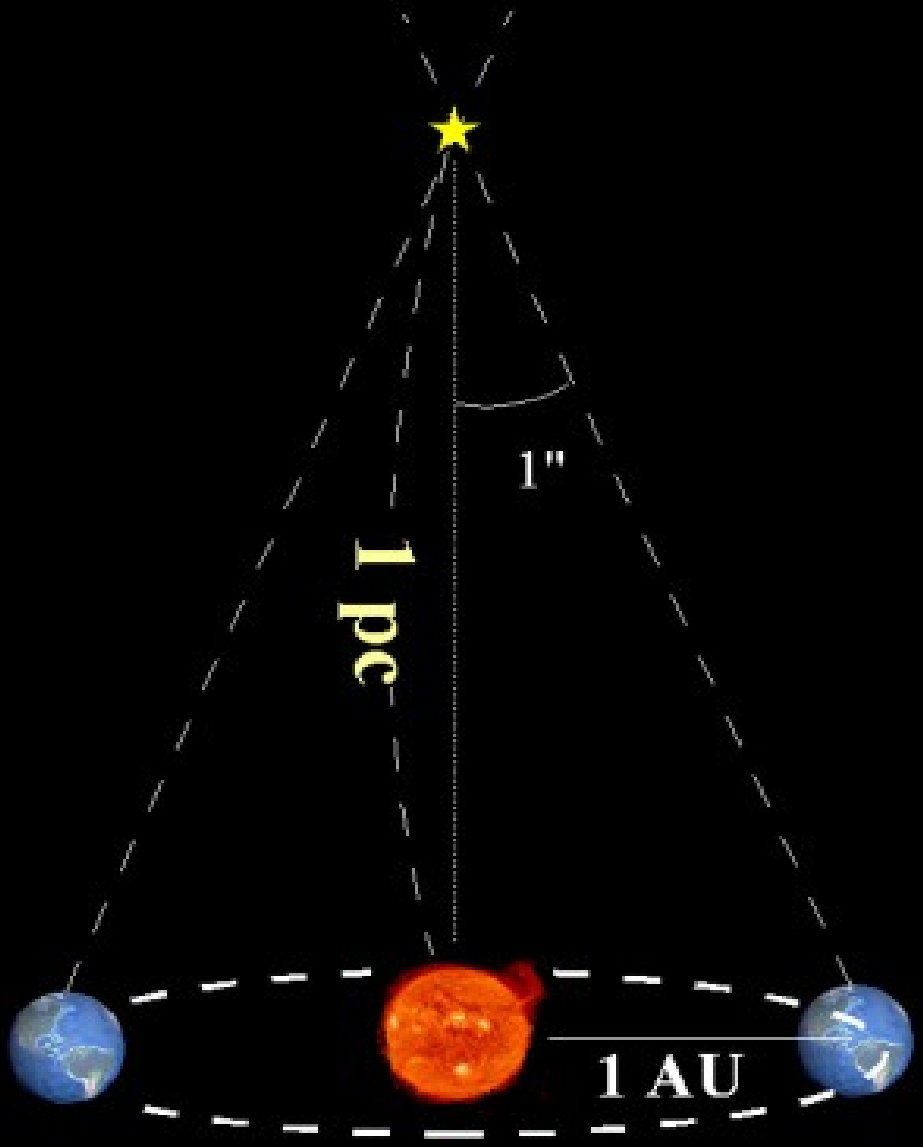
1 hora = 60 minutos ou 60 × 60 segundos = 3.600 segundos

1 dia = 24 horas ou 3600 × 24 = 86.400 segundos

1 ano = 365 dias ou 86.400 × 365 = 31.536.000 segundos

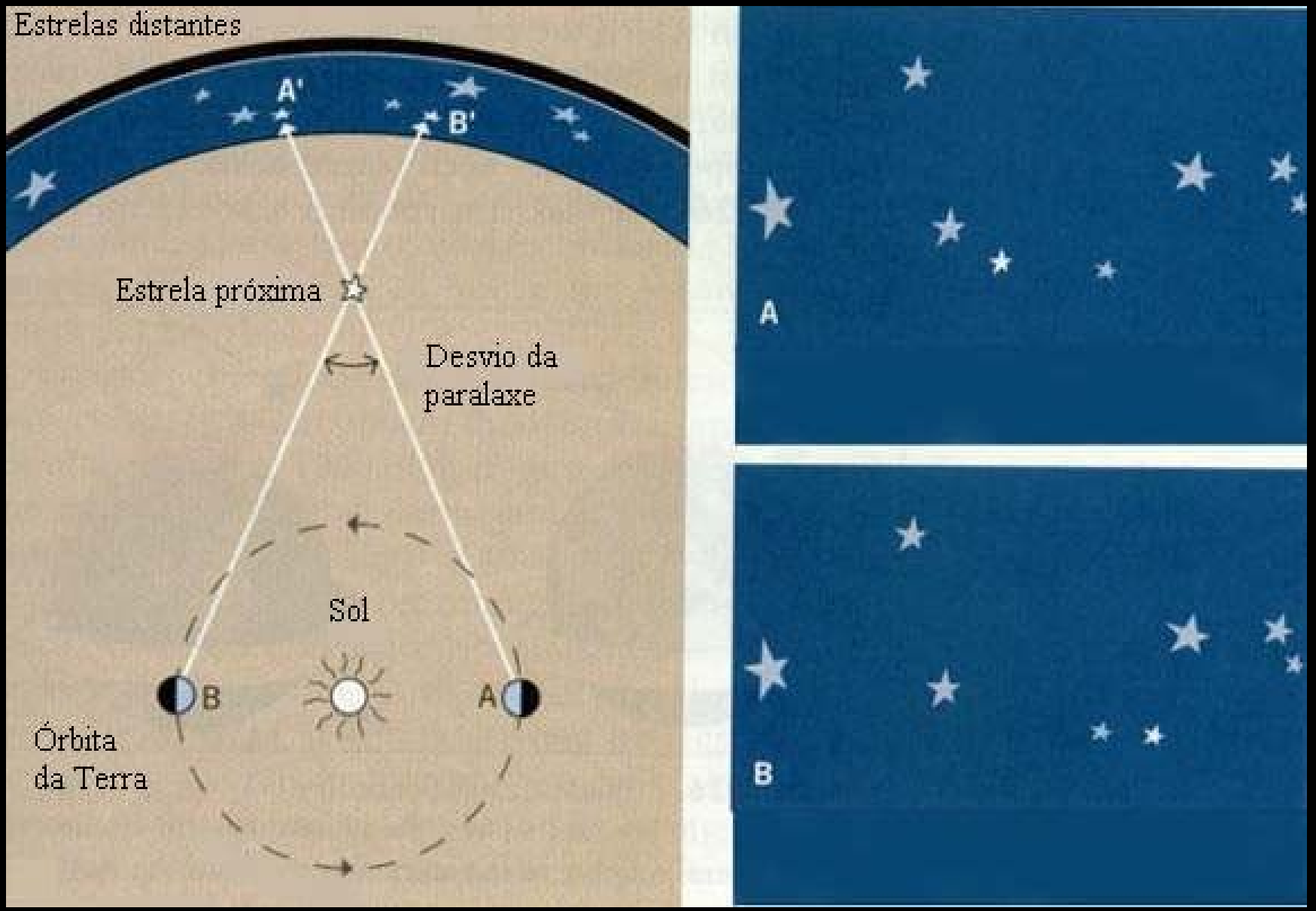
1 ano-luz = 300.000 quilômetros por segundo × 31.536.000 segundos = 9.460.800.000.000

Parsec (pc)



Objeto com paralaxe de 1 segundo de arco.

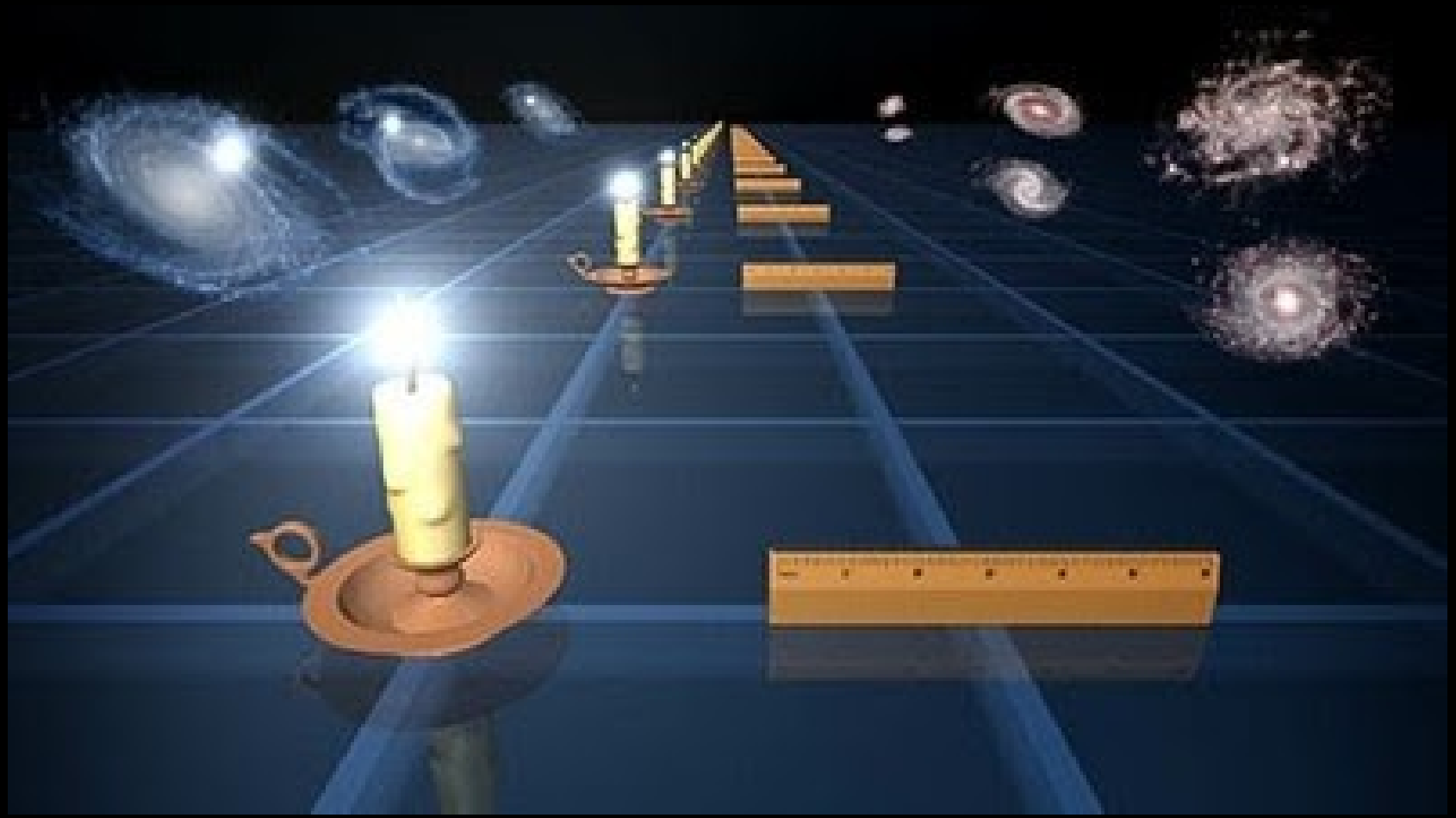
3,08567758 × 10^16 m
3,26156 anos luz

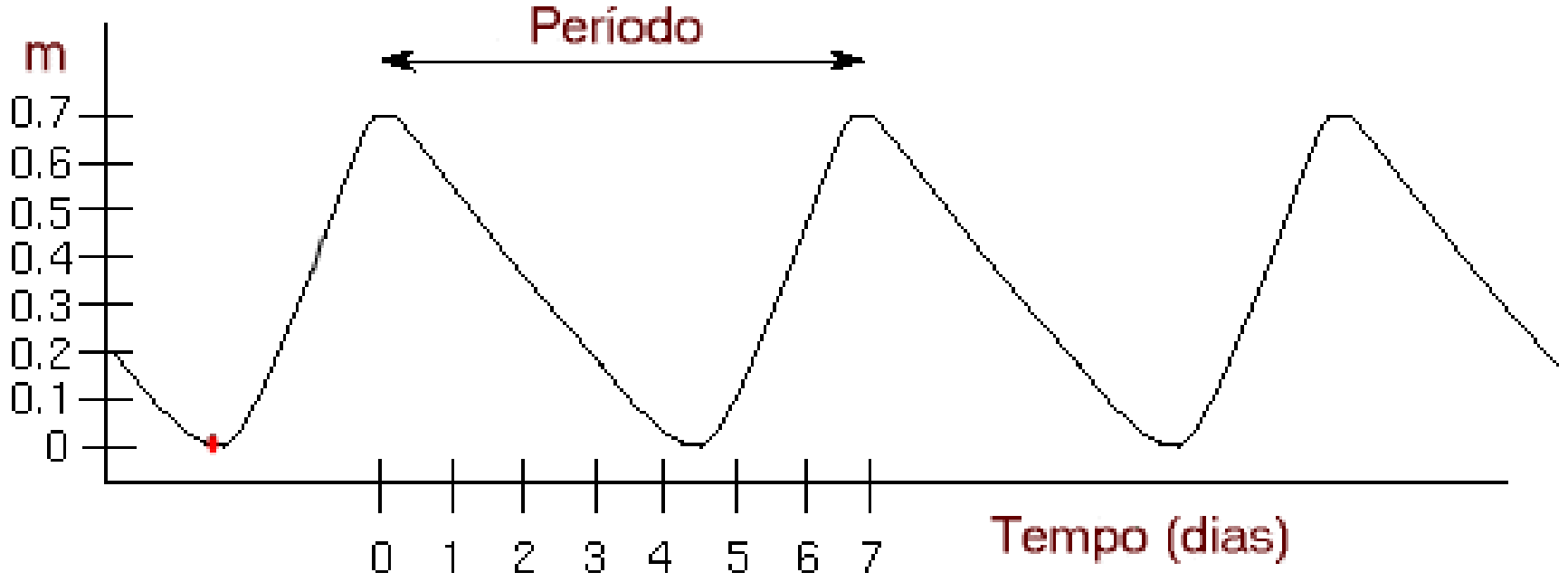

Estrelas distantes
A'
B'
Estrela próxima
Desvio da
paralaxe
Sol
B
A
Órbita
da Terra
A
B

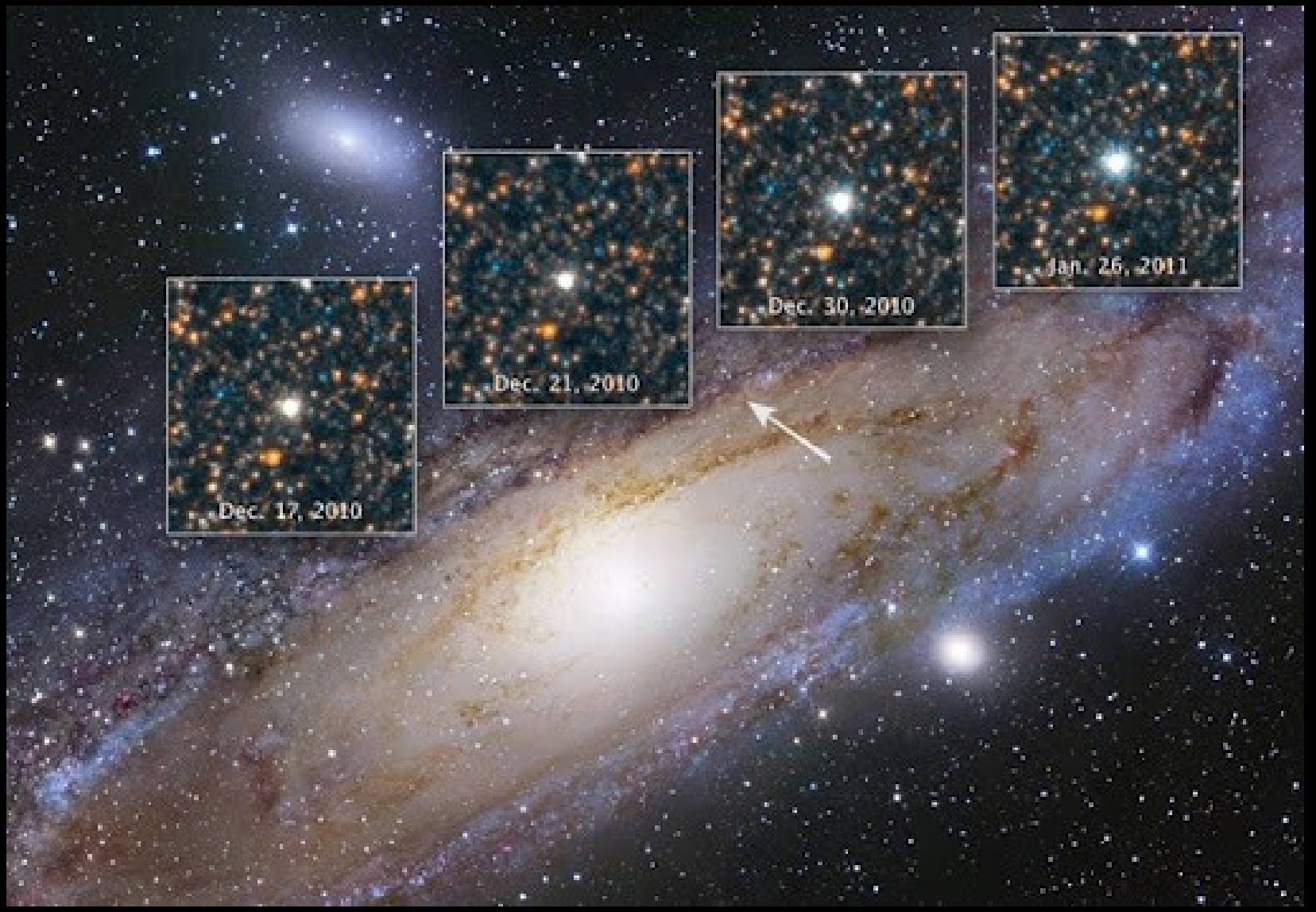
Em 1838 o astrônomo alemão Bessel obteve 0,316” para a paralaxe da estrela 61 Cygni.

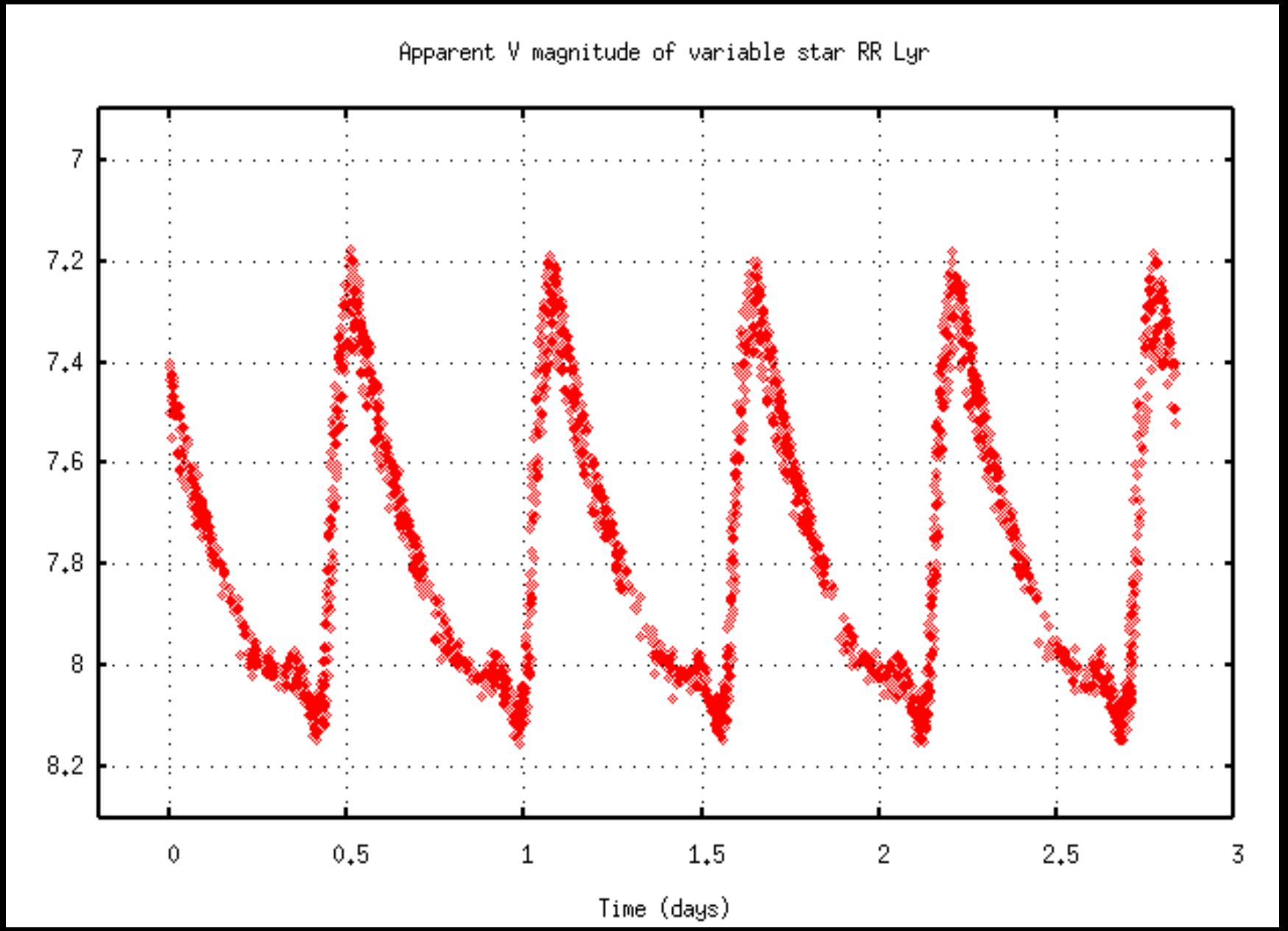
Isto nos permite calcular a distância até 61 Cygni como 3,16 pc ou 10,3 a.l

Medidas Comparativas

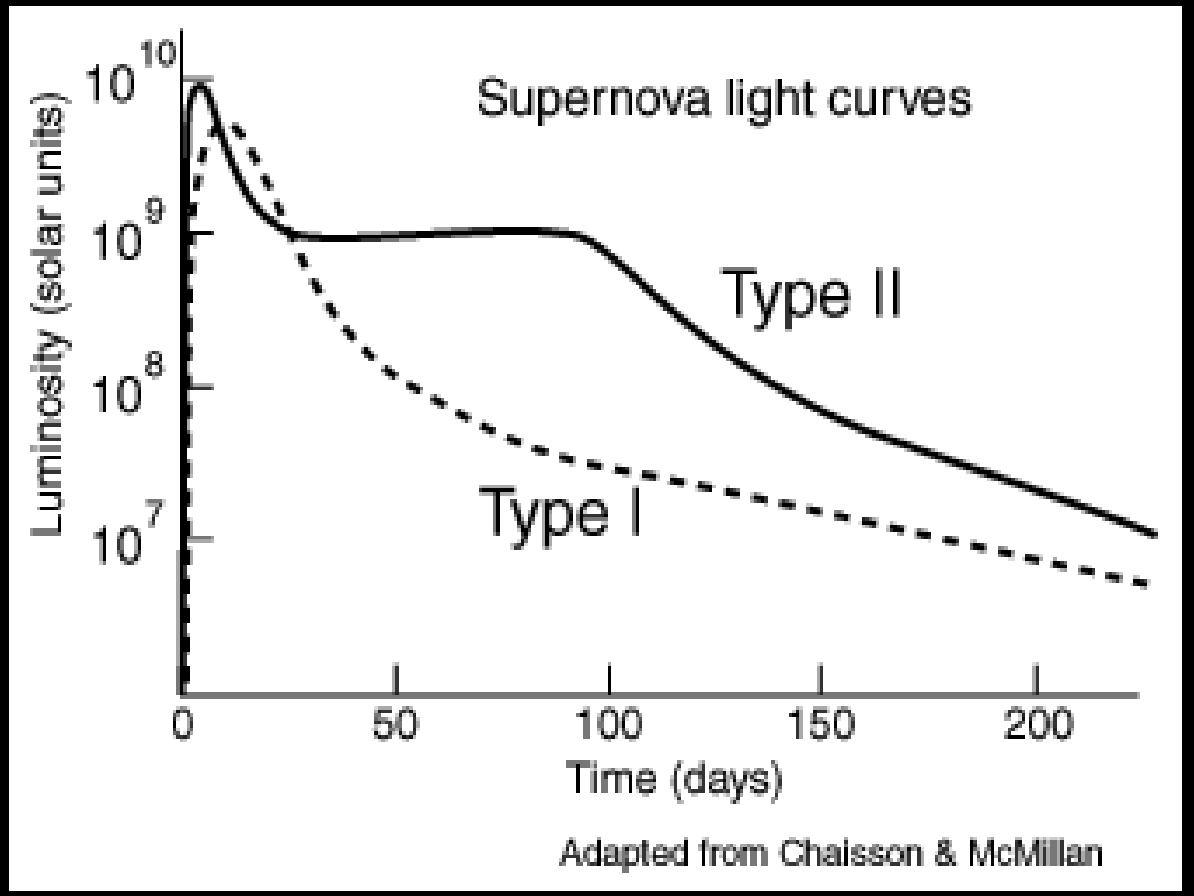



Período
m
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 1 2 3 4 5 6 7
Tempo (dias)

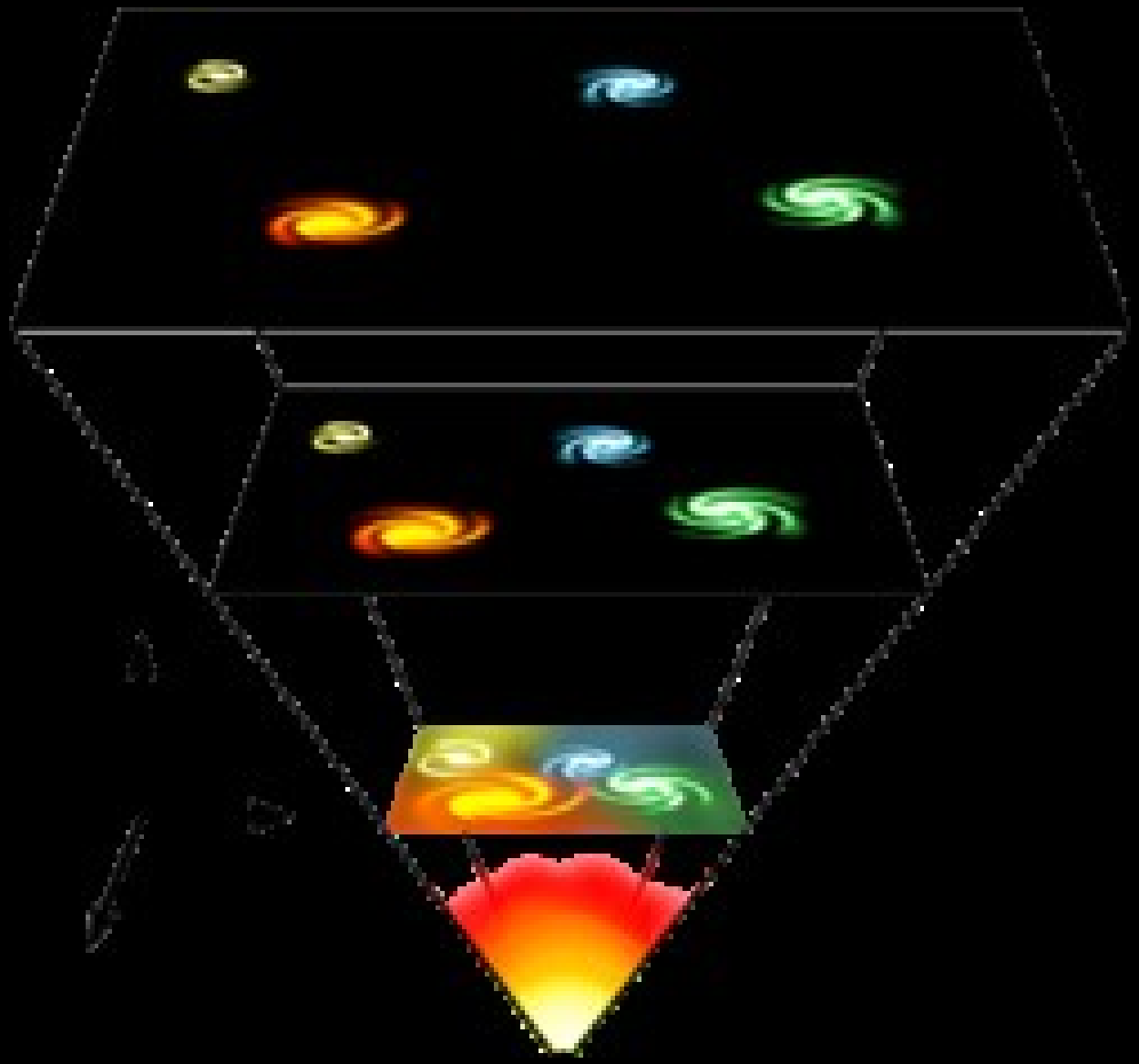

Dec. 17, 2010
Dec. 21, 2010
Dec. 30, 2010
Jan. 26, 2011


Apparent V magnitude of variable star RR Lyr
7
7.2
7.4
7.6
7.8
8
8.2
0
0.5
1
1.5
2
2.5
3
Time (days)

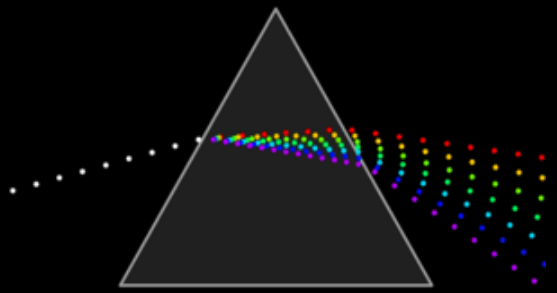

SN 2011fe

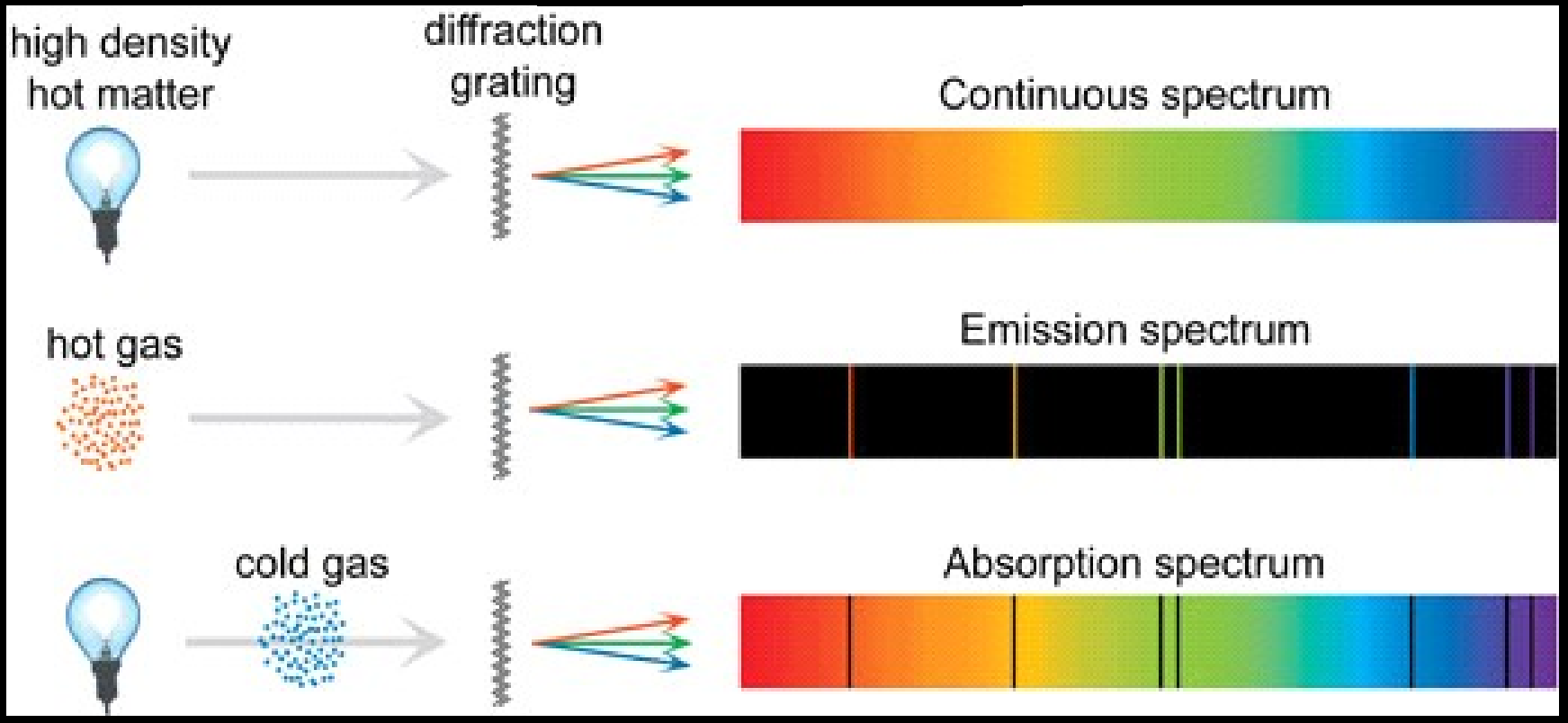

Supernova light curves
Luminosity (solar units)
10^{10}
10^{9}
10^{8}
10^{7}
Type II
Type I
0
50
100
150
200
Time (days)
Adapted from Chaisson & McMillan

Redshift



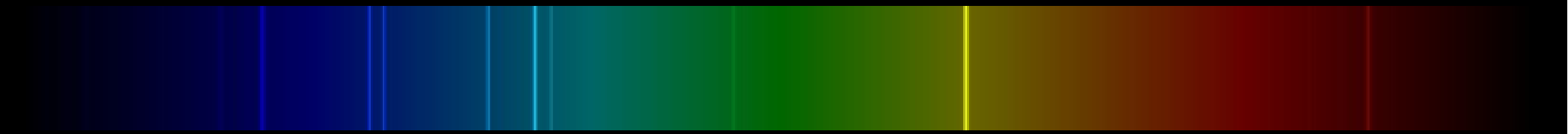
Espectro e linhas de emissão



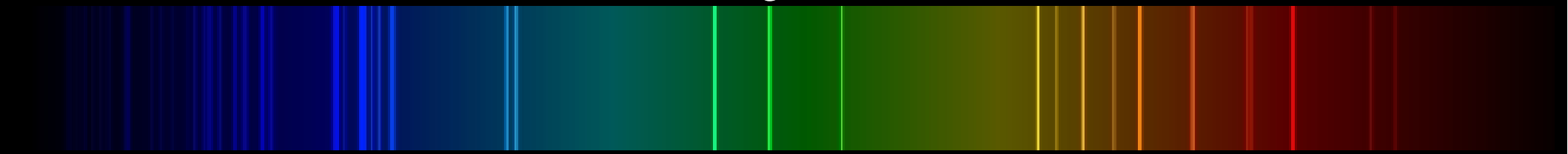


Hidrogênio

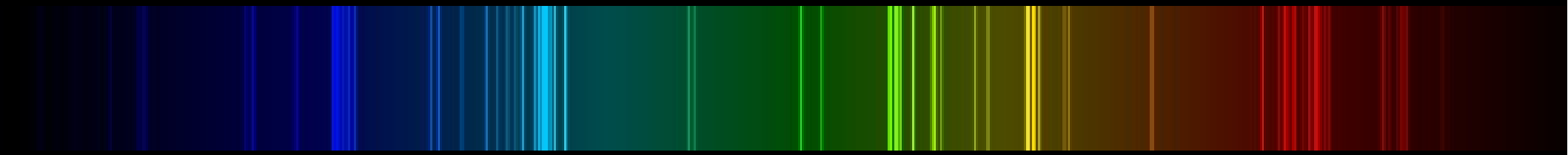
Hélio



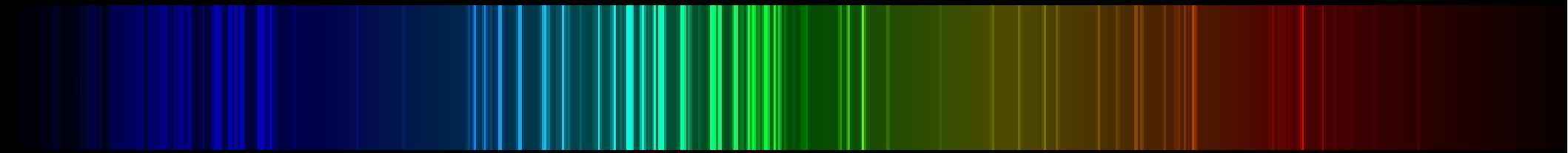
Oxigênio

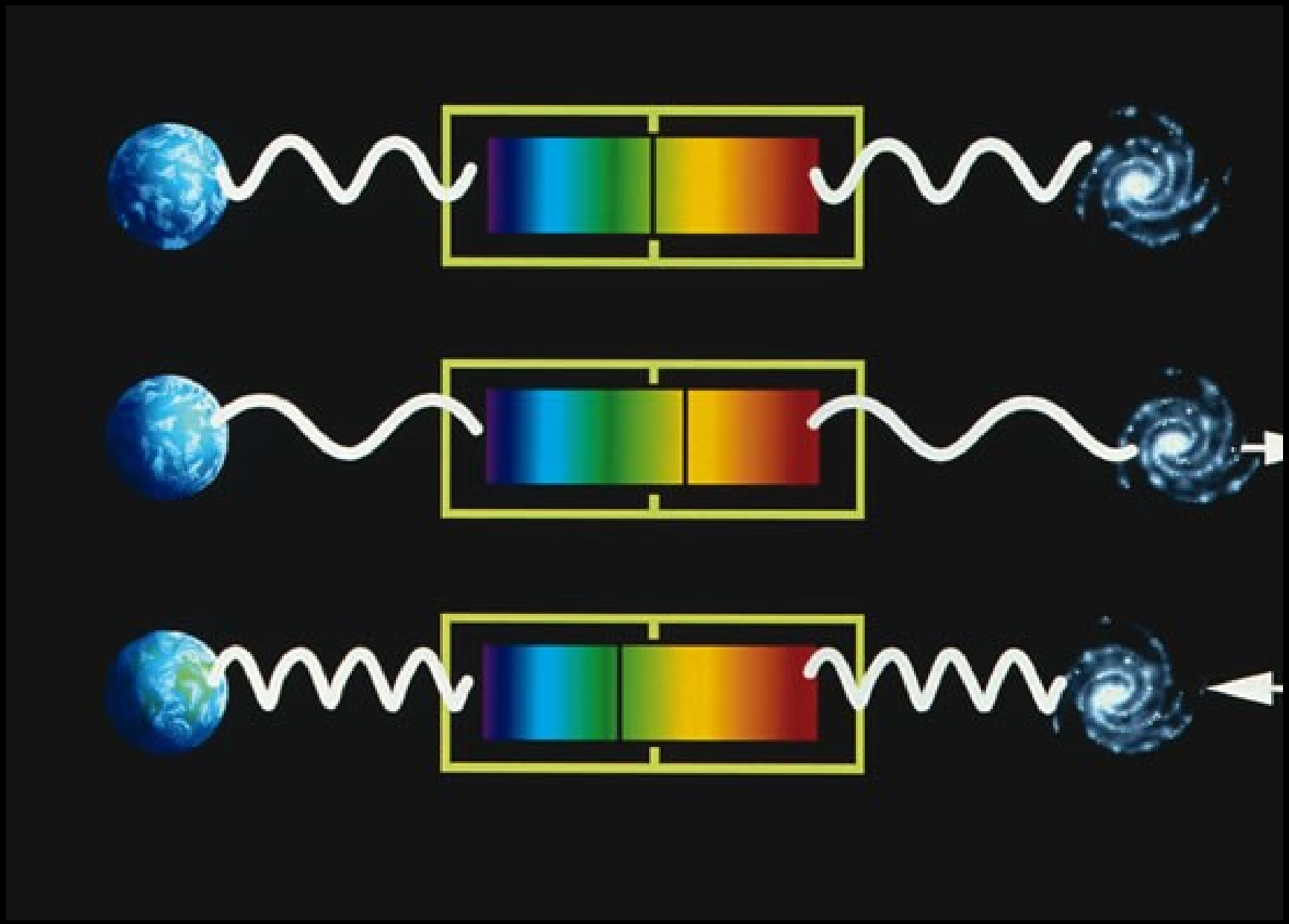


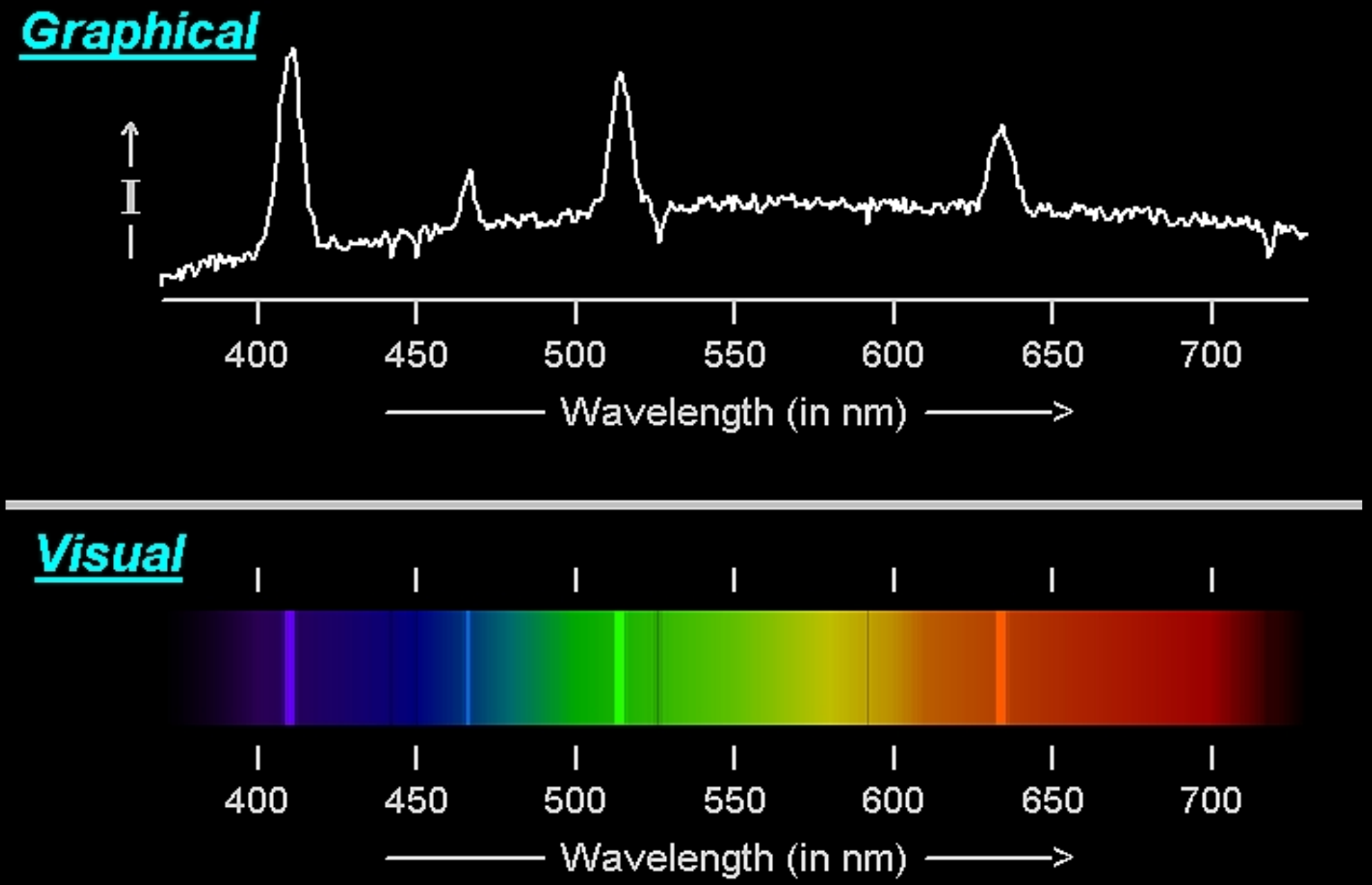
Nitrogênio

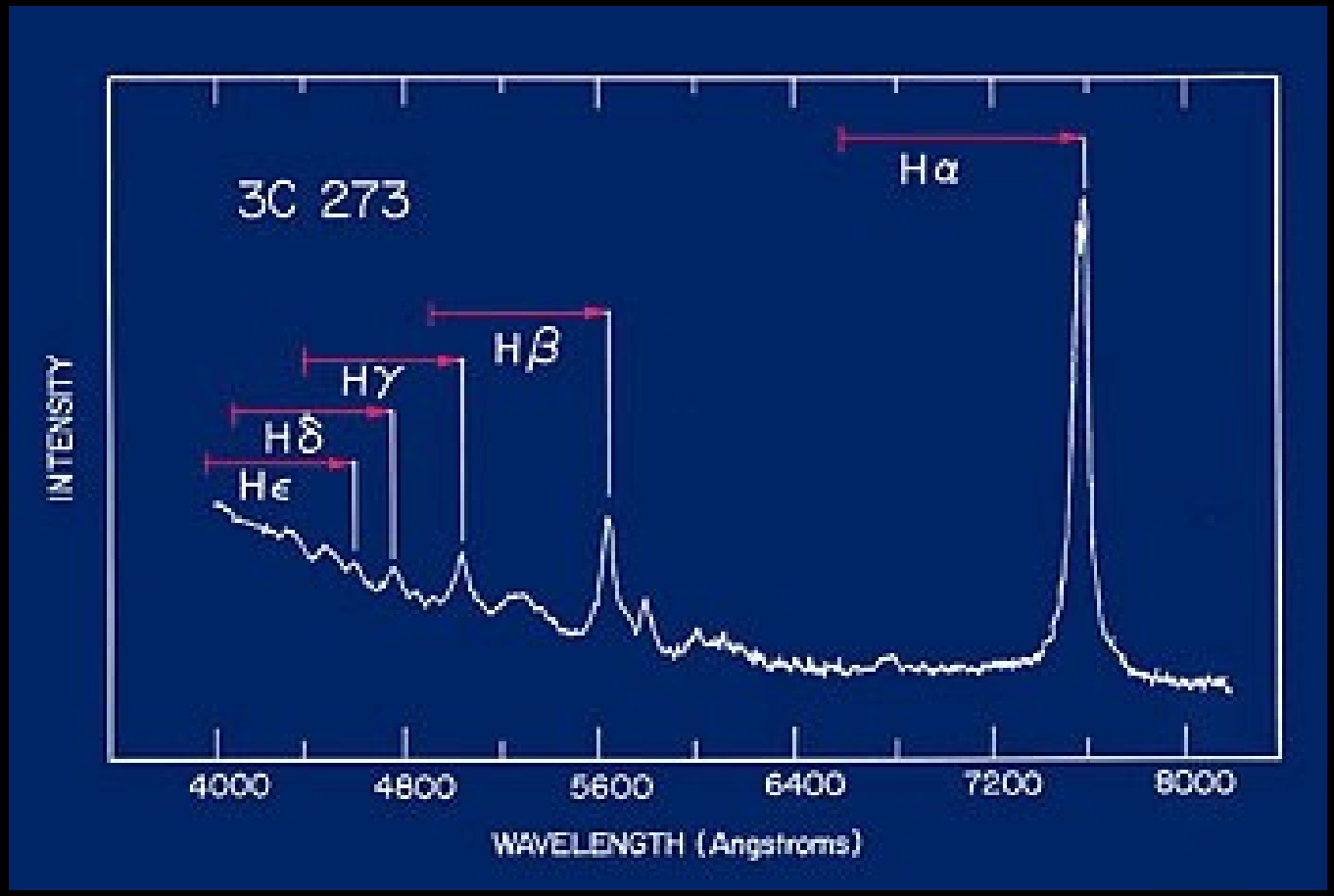


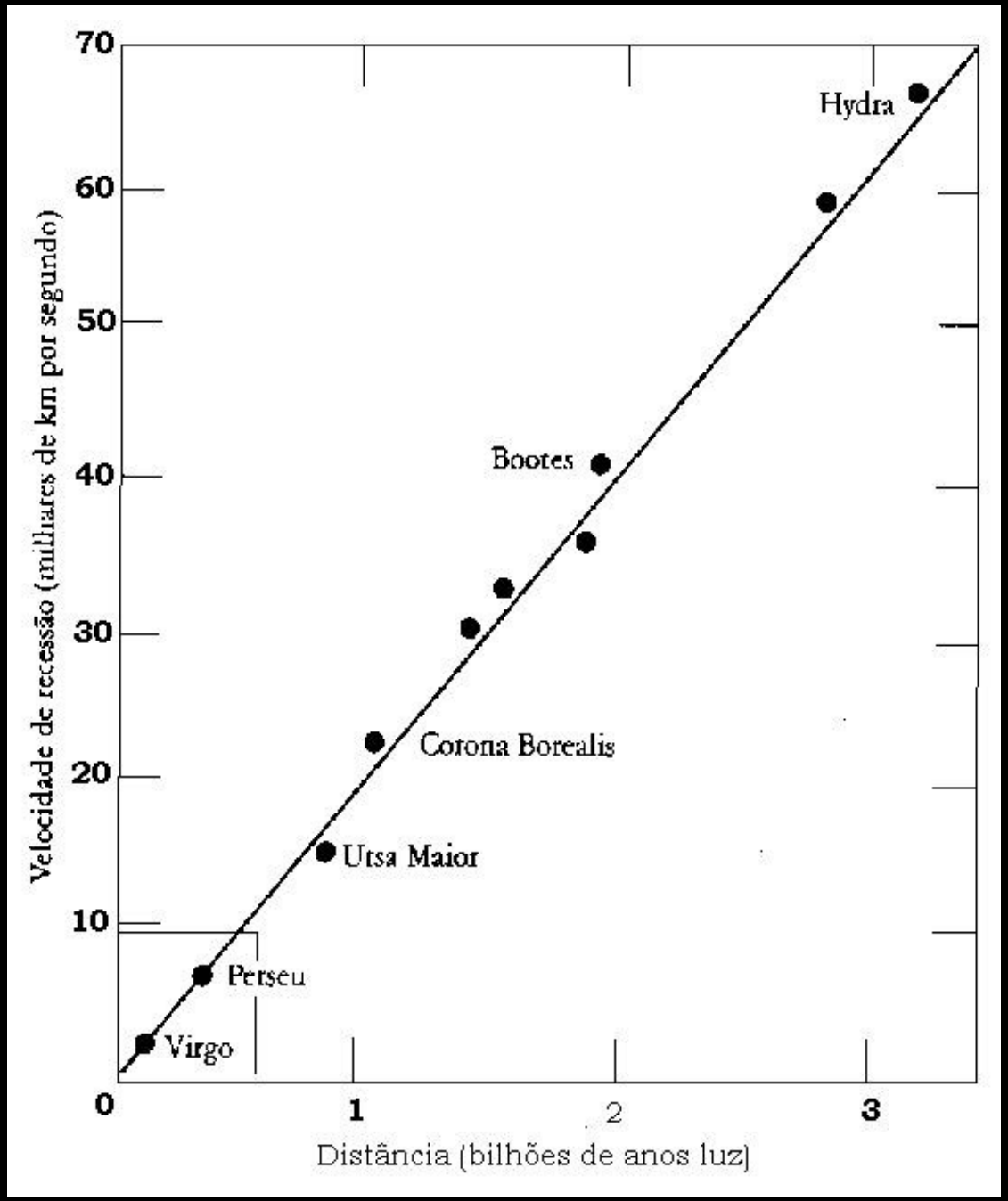
Ferro



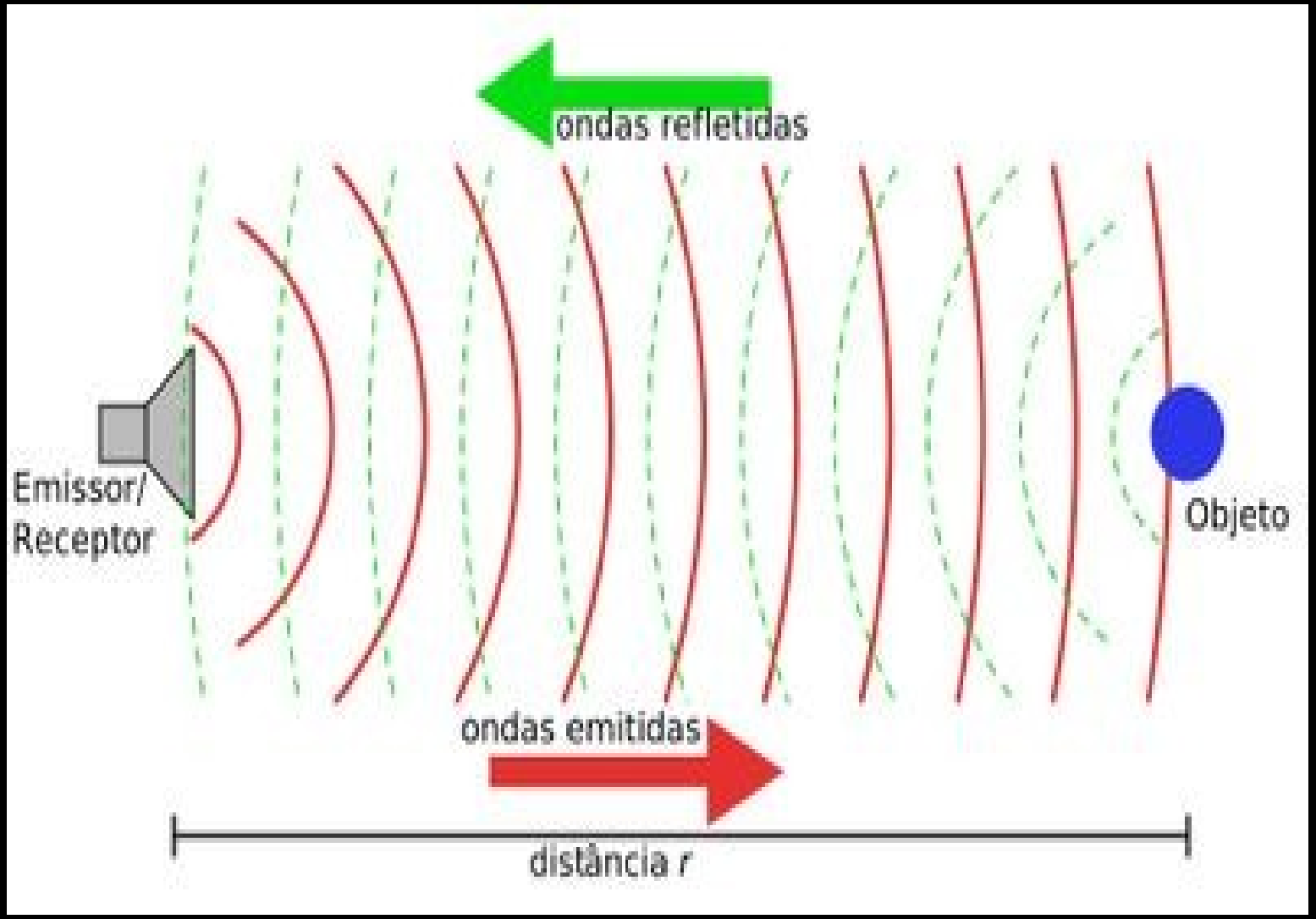



Graphical
I
400
450
500
550
600
650
700
Wavelength (in nm)
Visual
400
450
500
550
600
650
700
Wavelength (in nm)

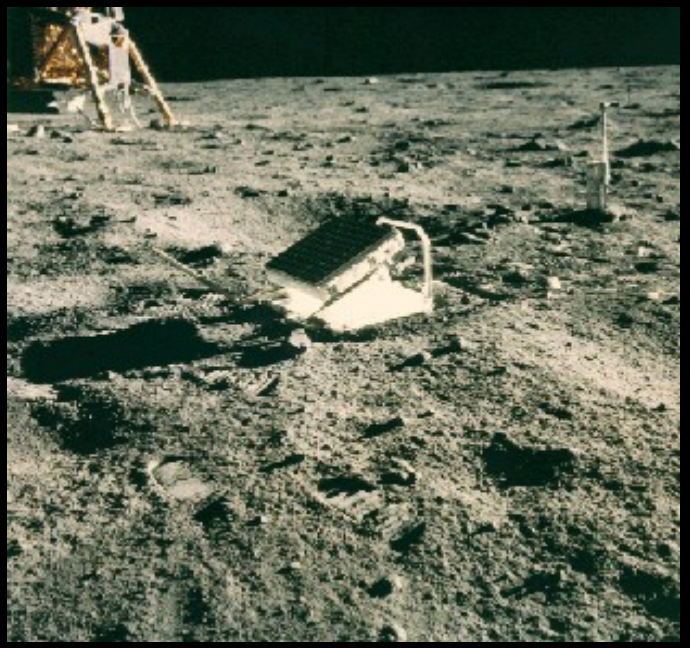

3C 273
Hα
Hβ
Hγ
Hδ
Hε
INTENSITY
4000
4800
5600
6400
7200
8000
WAVELENGTH (Angstroms)

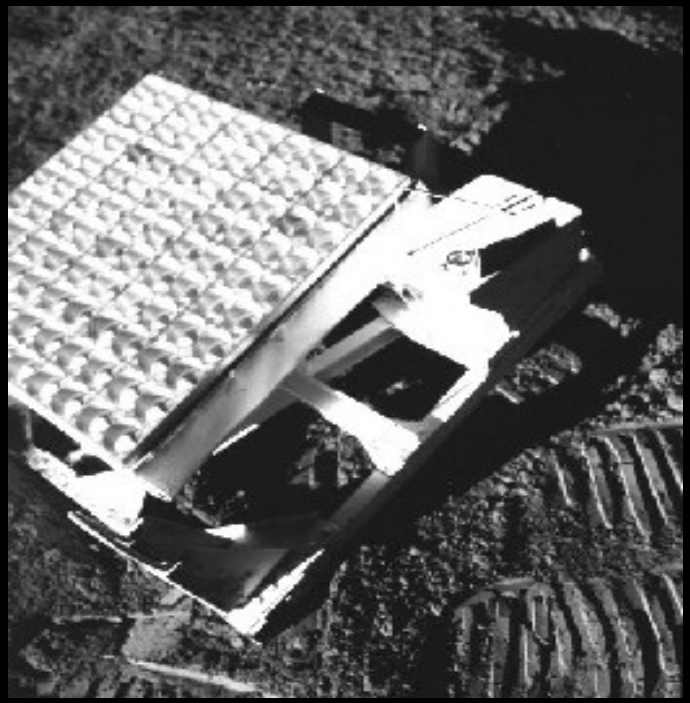

70
60
50
40
30
20
10
0
1
2
3
Velocidade de recessão (milhares de km por segundo)
Distância (bilhões de anos luz)
Hydra
Bootes
Corona Borealis
Utsa Maior
Perseu
Virgo

Radar


ondas refletidas
Emissor/
Receptor
Objeto
ondas emitidas
distância r

Distância Terra - Lua





FIM