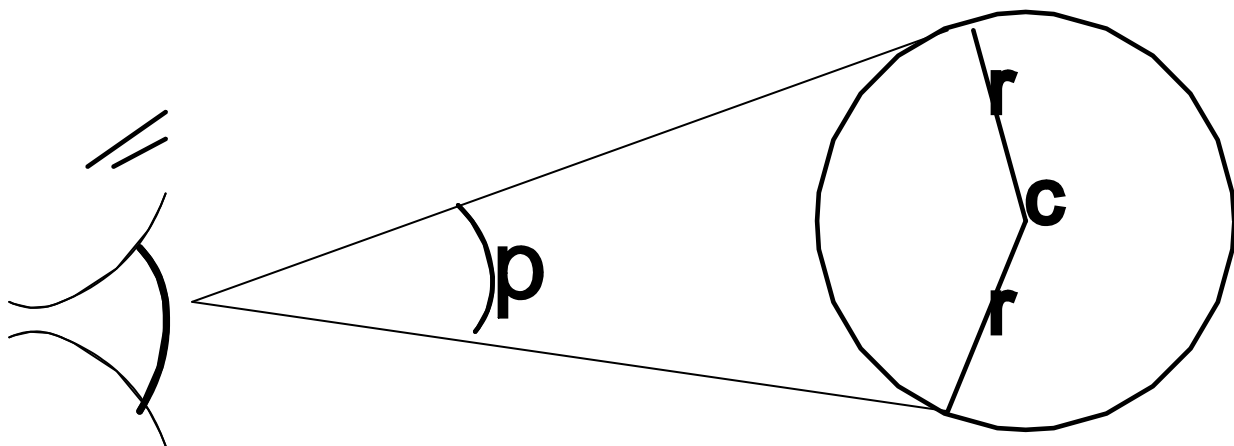
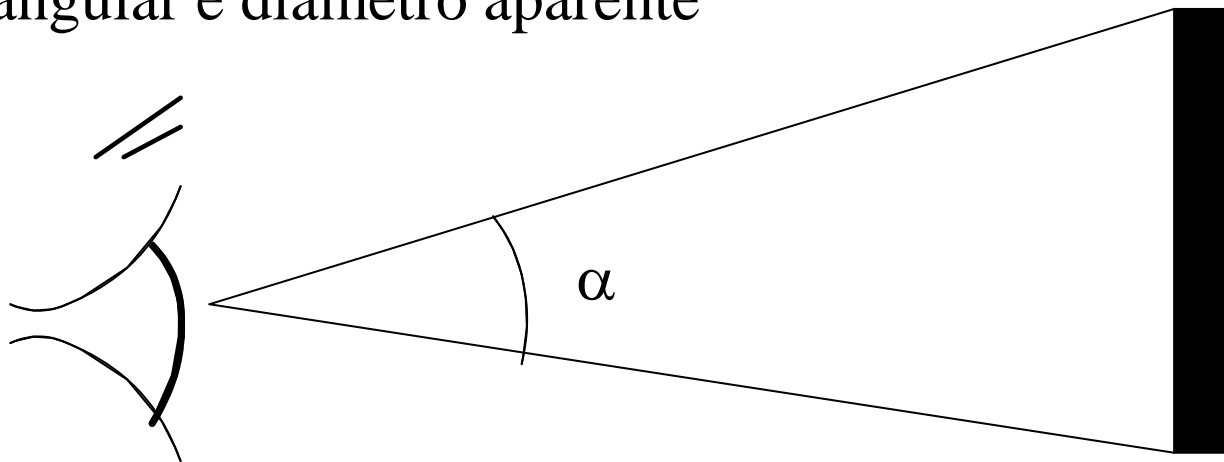


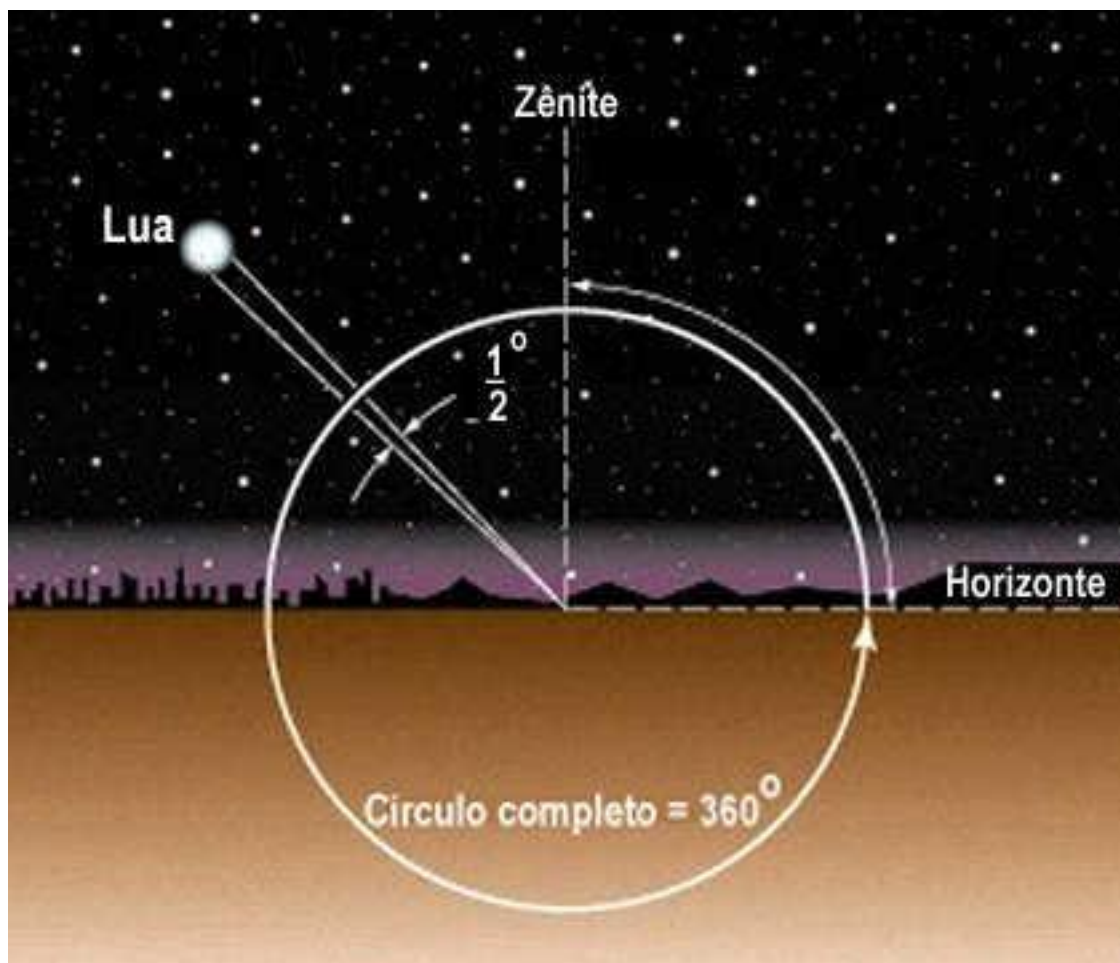


SISTEMAS DE COORDENADAS CELESTES

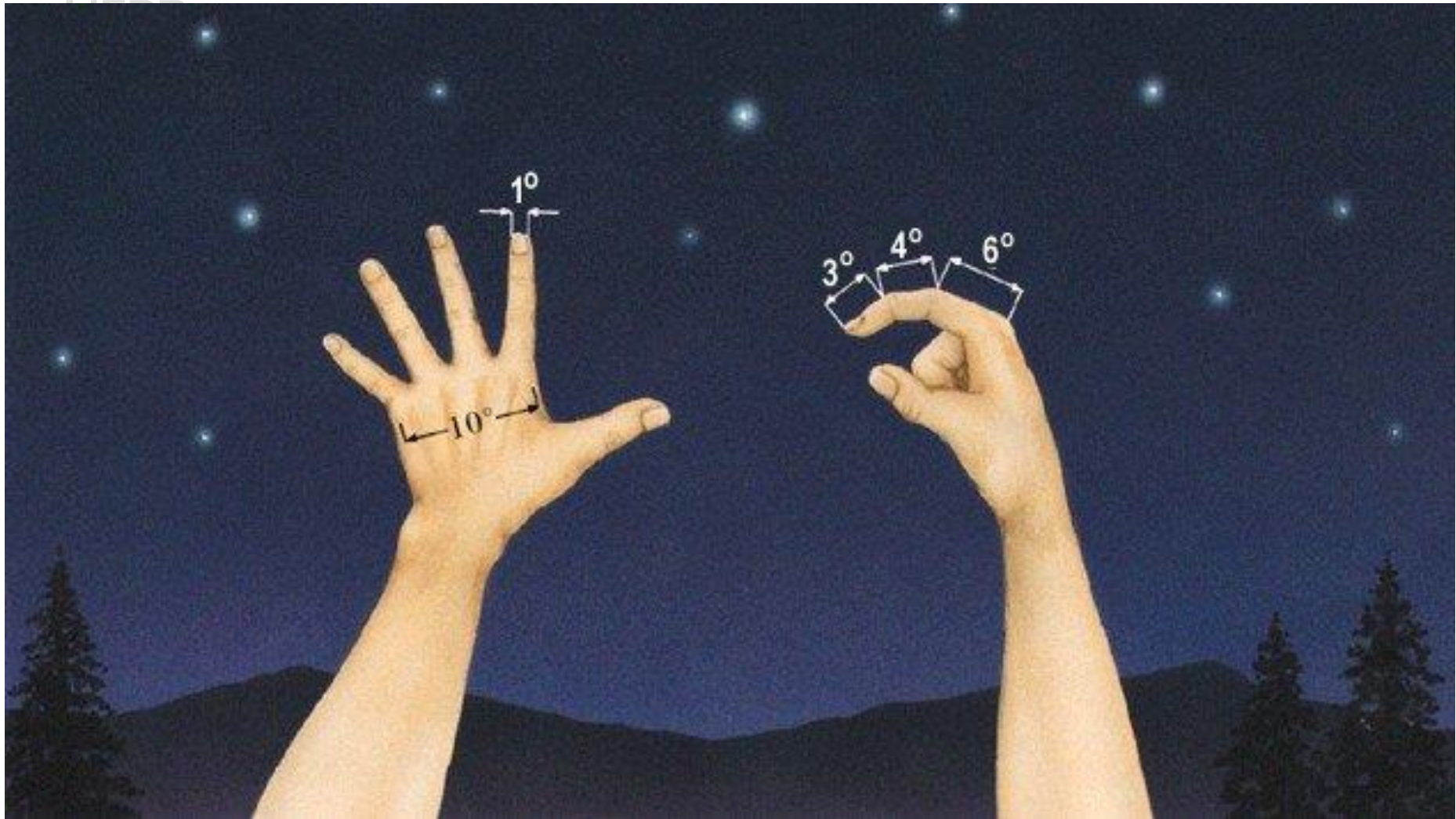
Prof. Dr. Carlos Aurélio Nadal

Distância angular e diâmetro aparente



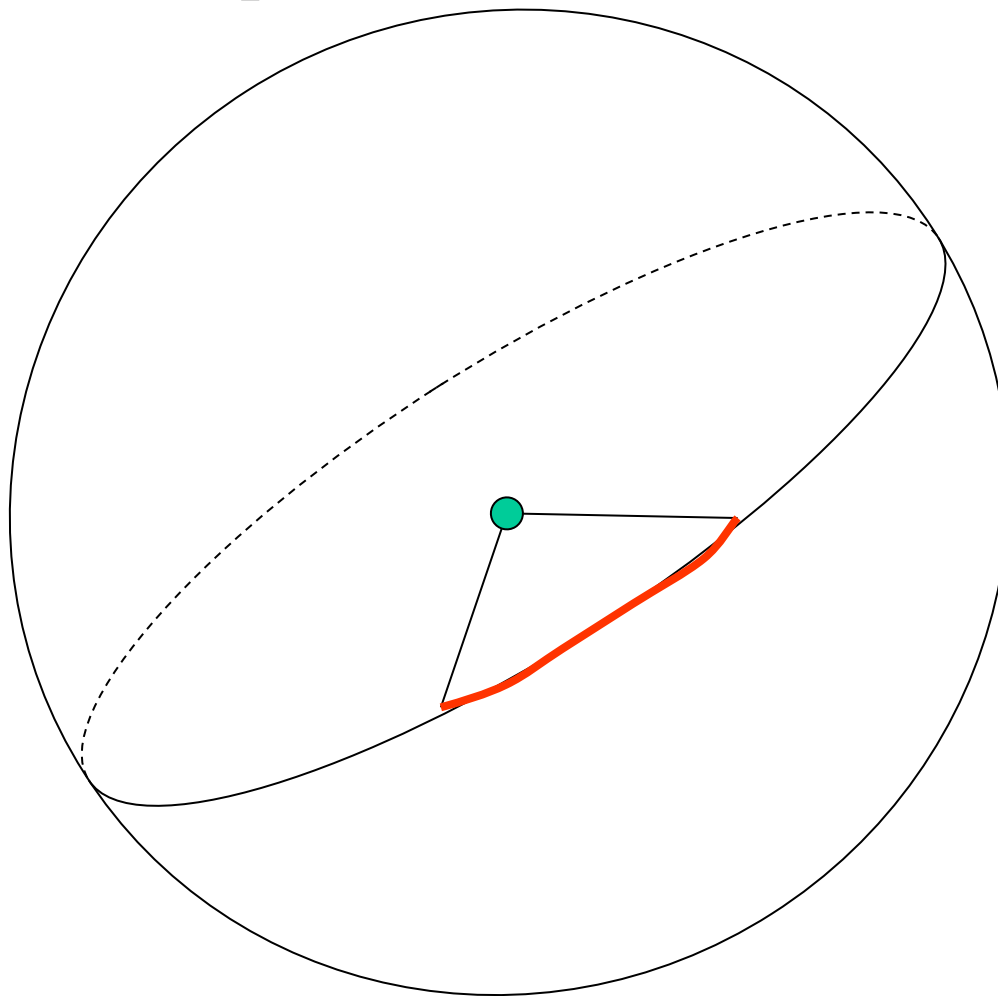


Diâmetro aparente da Lua

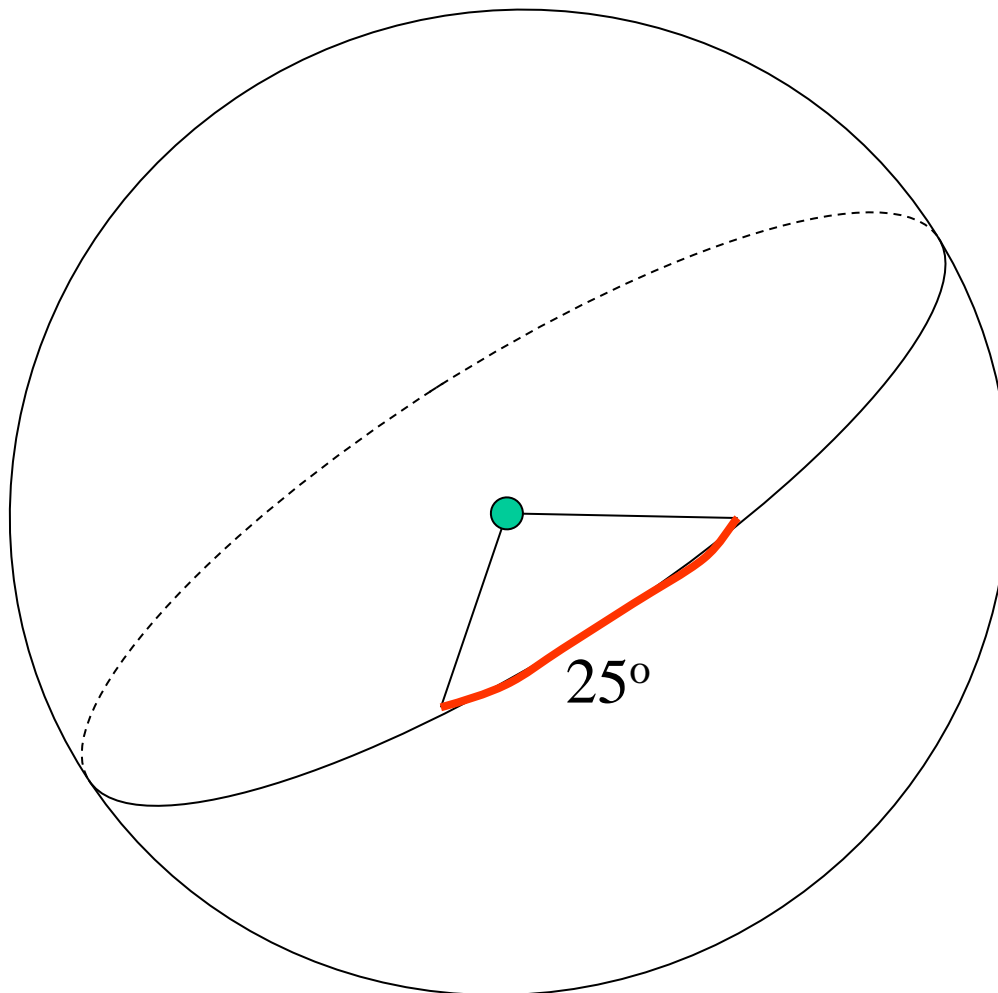


Medidas angulares com o auxílio das mãos

Ângulo medido a partir do centro da Terra

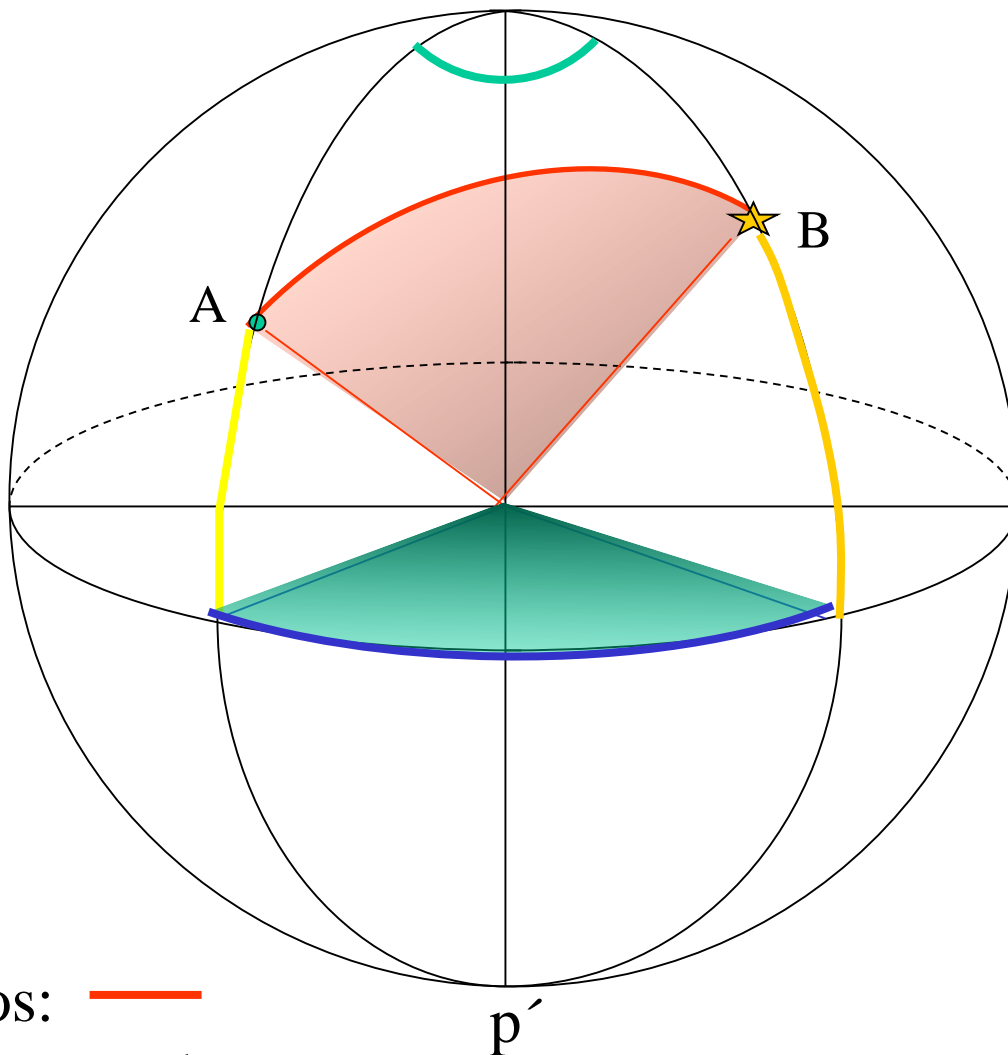


Círculo máximo: é todo círculo que contem o centro da Terra



Uma milha náutica subtende um ângulo de $1'$ na Terra e equivale a 1852m.

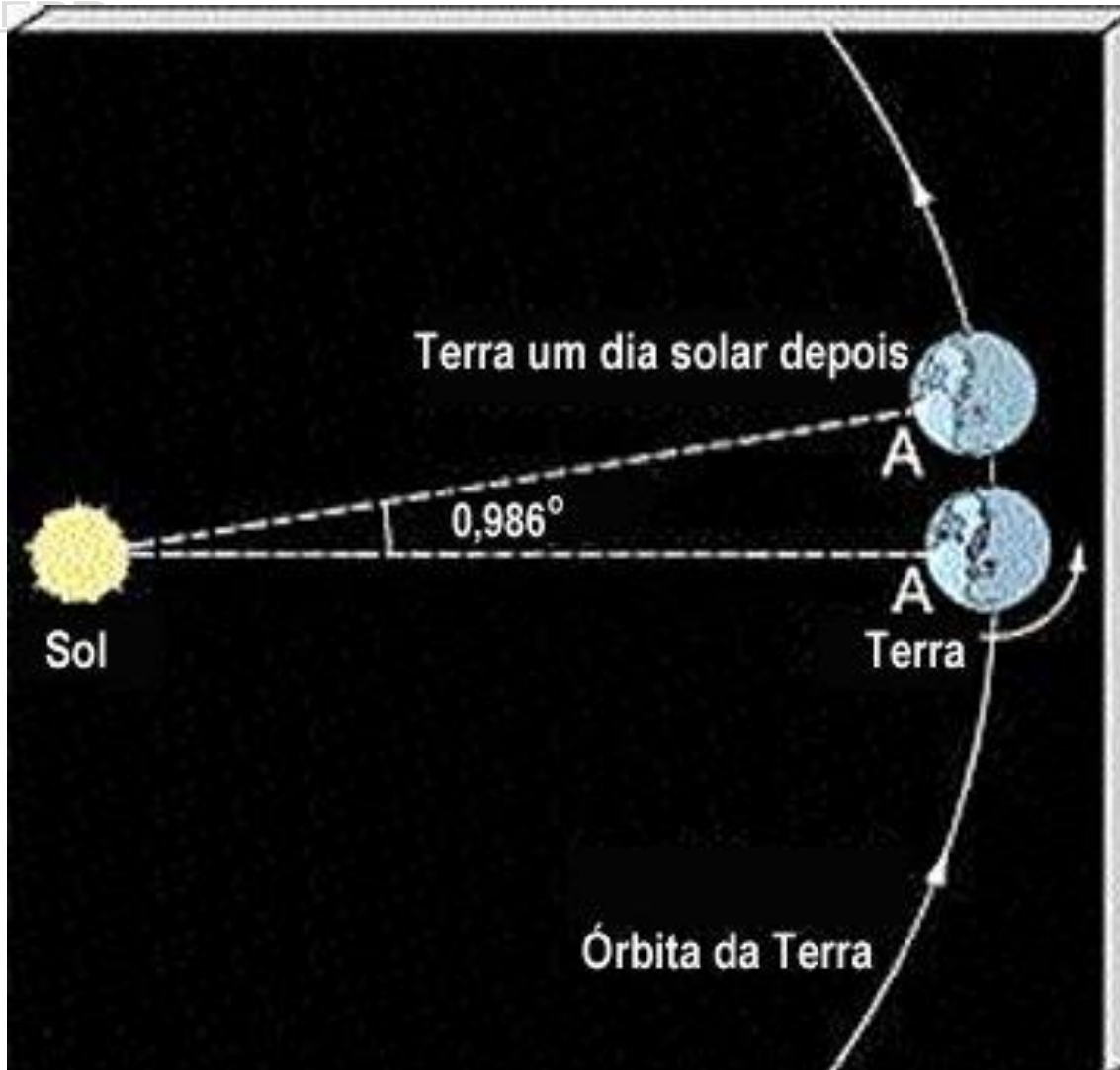
Se o ângulo representado vale 25° então $25 \times 60 = 1500$ mn



Ângulo entre dois pontos: — (red line)

Ângulo entre um ponto e um plano — (yellow line)

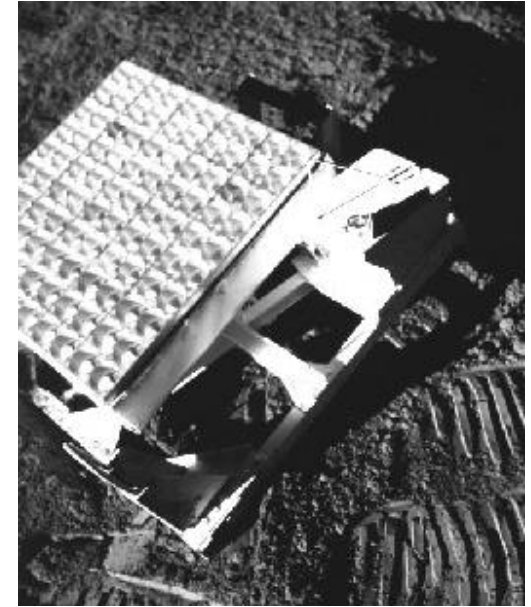
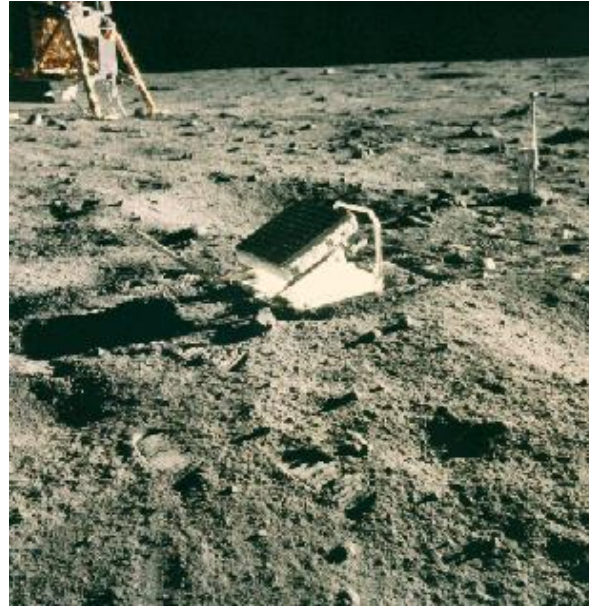
Ângulo entre dois planos — (green line)



360° em 365 dias

1° por dia

Distância angular percorrida pela Terra na eclíptica



A distância Terra-Lua é medida através do LLR, utilizando prismas instalados durante as missões tripuladas

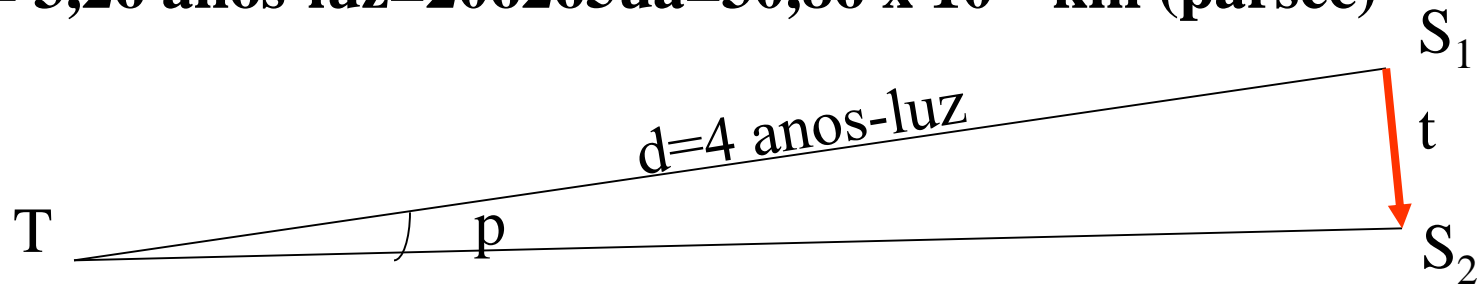
Distância da Terra à estrelas.

A estrela mais próxima denominada α Centauri está a 4,2 anos-luz.

1 ano-luz: distância percorrida pelas ondas eletromagnéticas em um ano. Sendo a velocidade da luz no vácuo $c = 299792458$ m/s, resulta em $9,46 \times 10^{12}$ km = 63240 ua = 0,3066 pc

1 ua = 149.597.910 km (distância Terra-Sol= unidade astronômica)

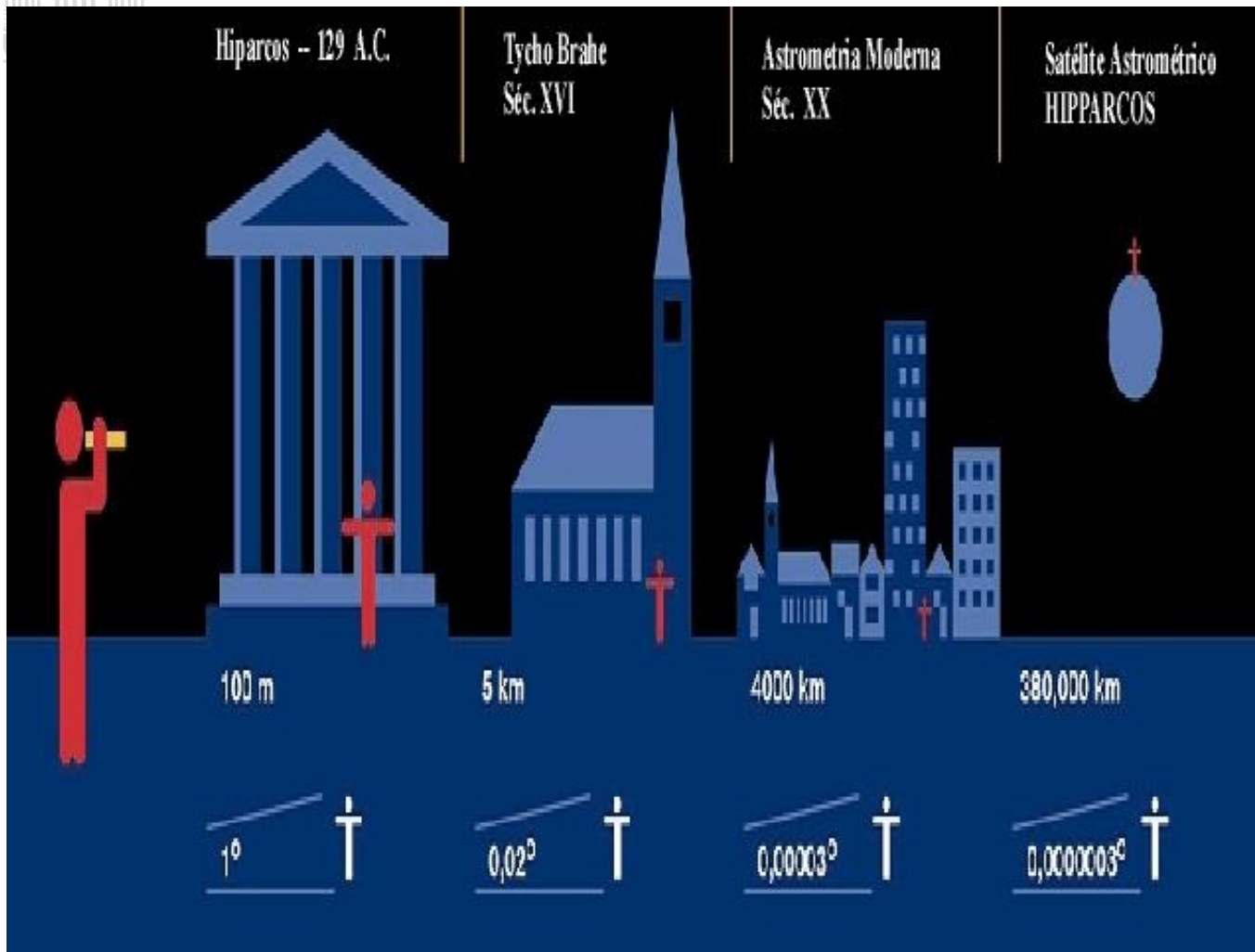
1pc = 3,26 anos-luz=206265ua=30,86 x 10¹² km (parsec)



p	t (anos-luz)	t(UA)
1°	0,07	442
1′	0,001	74

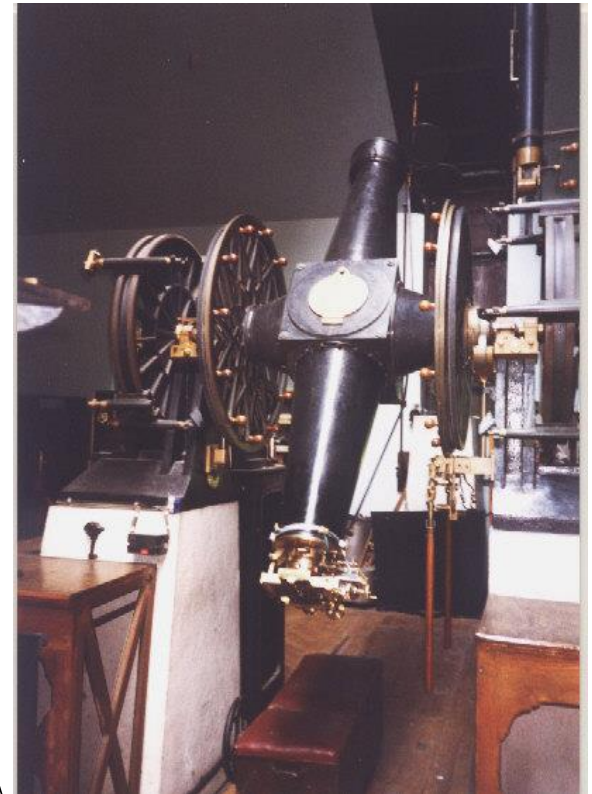
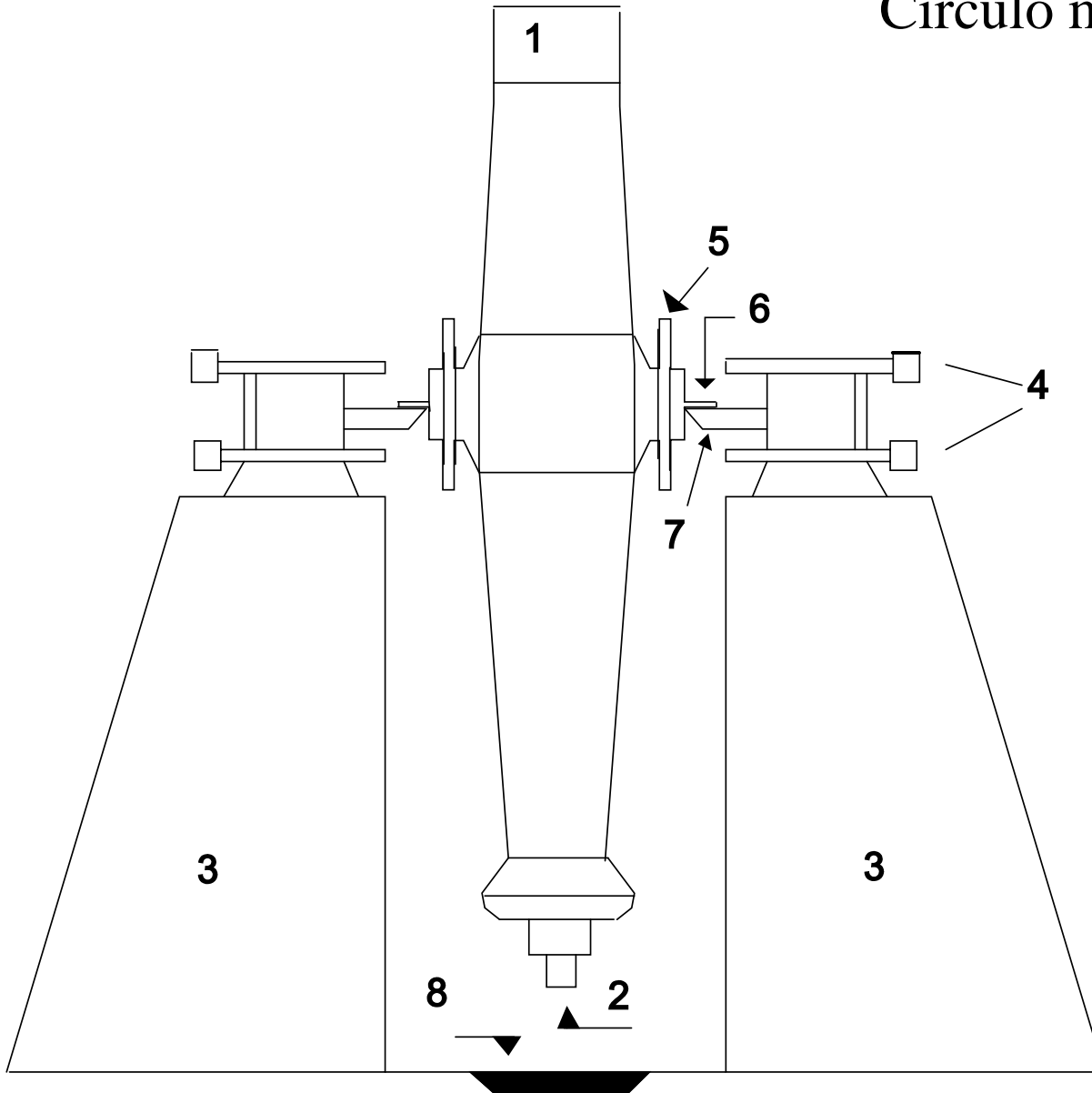
Estrelas mais próximas da Terra.

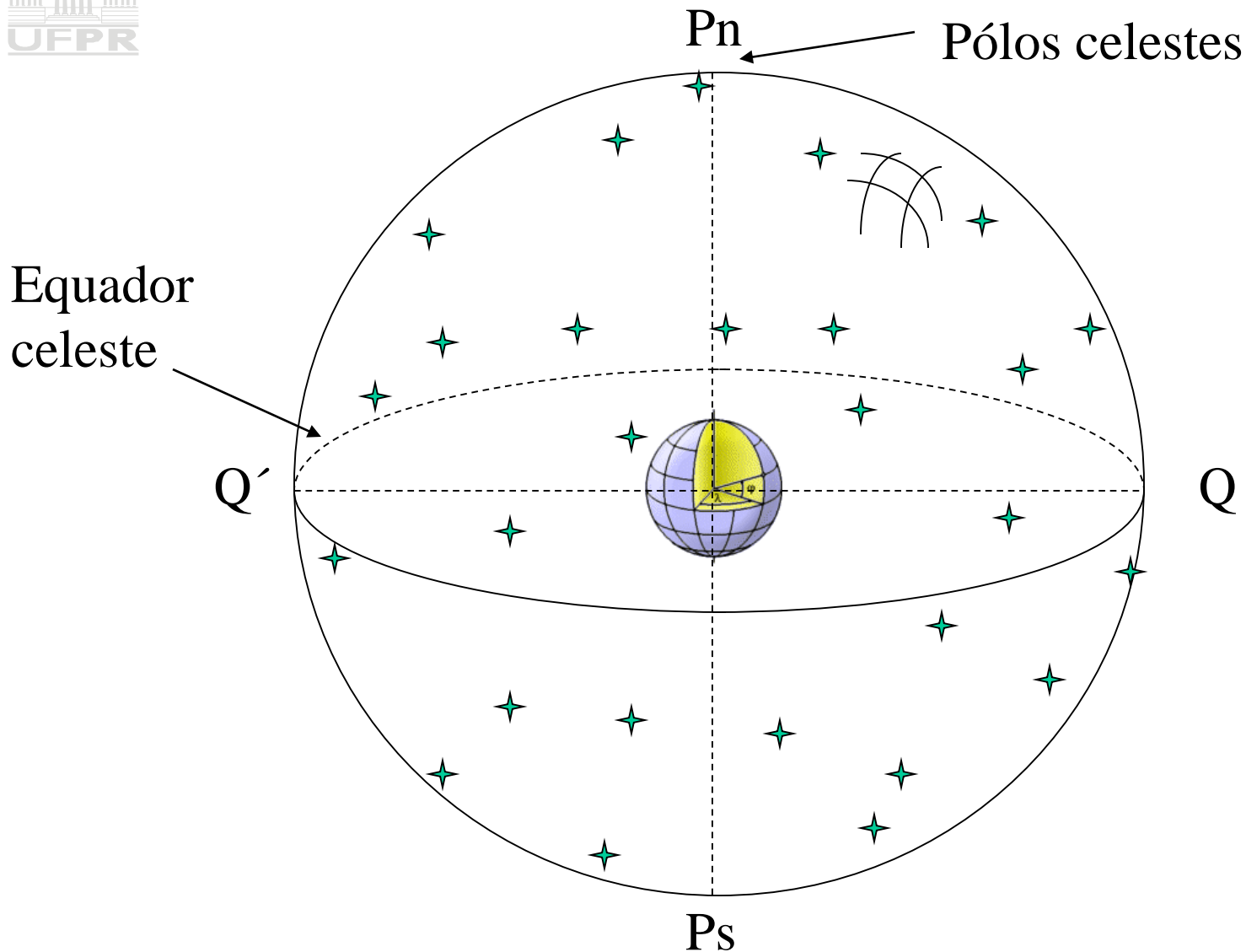
estrela	magnitude	paralaxe (")	mov. próprio ("/ano)	distância (anos-luz)
Próxima de Centauro	11,0	0,77	3,85	4,2
α Cen	0,3	0,76	3,68	4,3
Flecha de Barnard	9,6	0,53	10,29	6,1
Lalande 21185	7,4	0,41	4,78	7,9
α CMa (Sirius)	-1.6	0,37	1,32	8,7
$\alpha=11h12min \delta=57^\circ S$	12,0	0,34	2,69	9,5
Córdoba 243	8,3	0,32	8,75	10,2
ζ Cet	3,6	0,32	1,92	10,2
ε Eri	3,8	0,32	0,97	10,2
61 Cygni	5,6	0,32	5,25	10,2
α CMi (Procion)	0,5	0,31	1,24	10,4



Variação da acuracidade com o tempo em astrometria

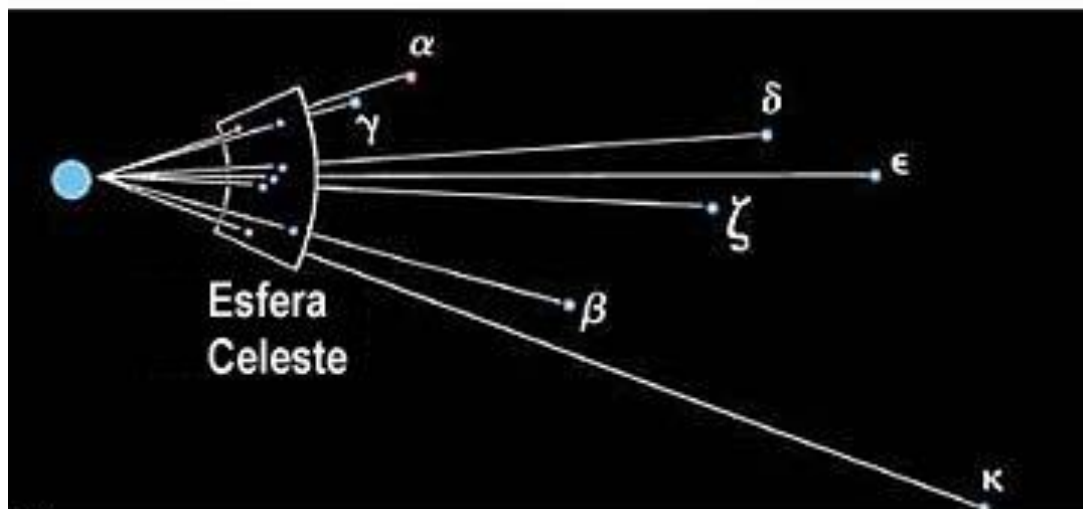
Círculo meridiano



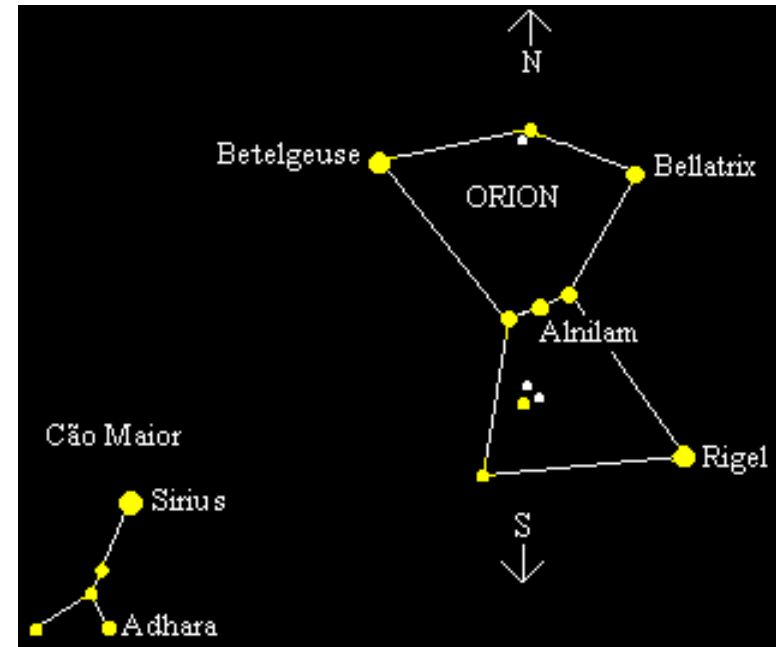


Esfera Celeste: é uma esfera de raio unitário (infinito) na superfície da qual se encontram engastadas todas as estrelas

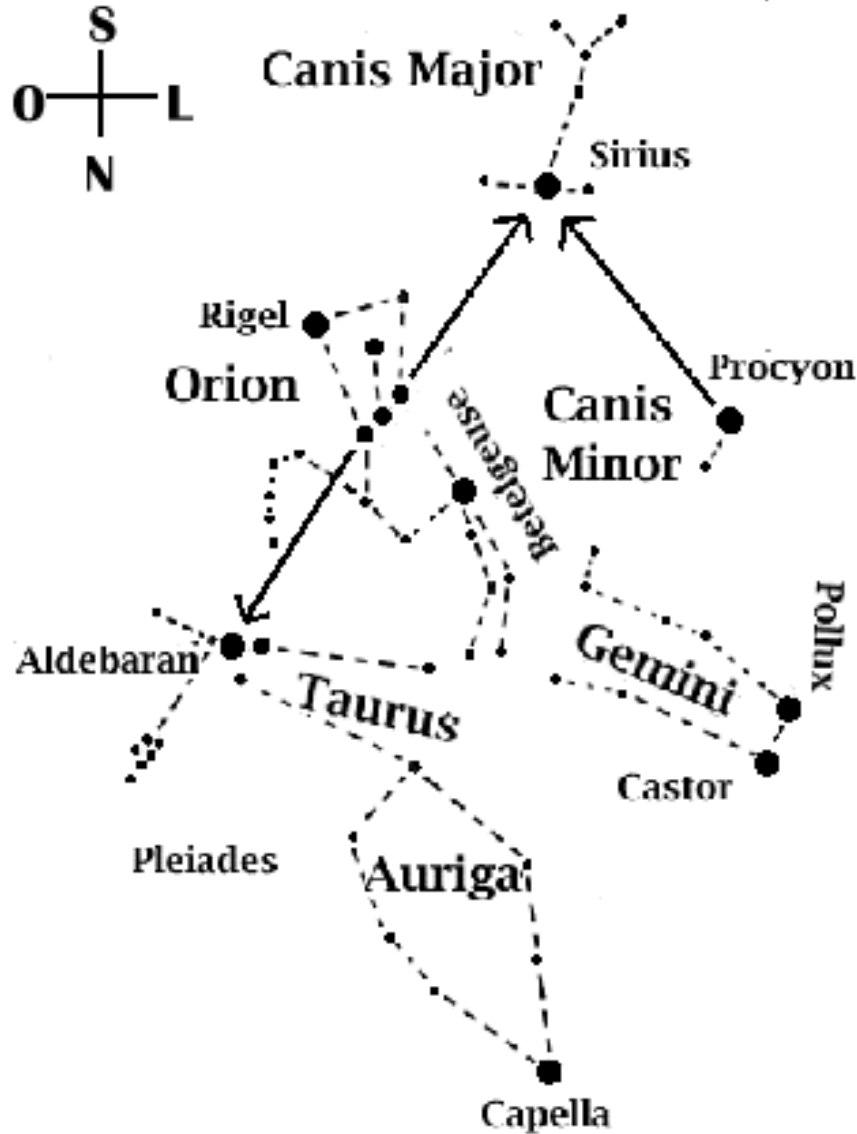
Planetas	Estrelas
Os planetas movem-se relativamente as estrelas na esfera celeste	A posição relativa das estrelas são fixas na esfera celeste
Devido a proximidade os planetas aparecem como discos ao telescópio	As estrelas aparecem como pontos de luz mesmo nos telescópios mais potentes
Os planetas brilhantes não cintilam	As estrelas apresentam cintilação
Os planetas se movem próximos a eclíptica	As estrelas são encontradas em qualquer posição da esfera celeste



Características da esfera celeste



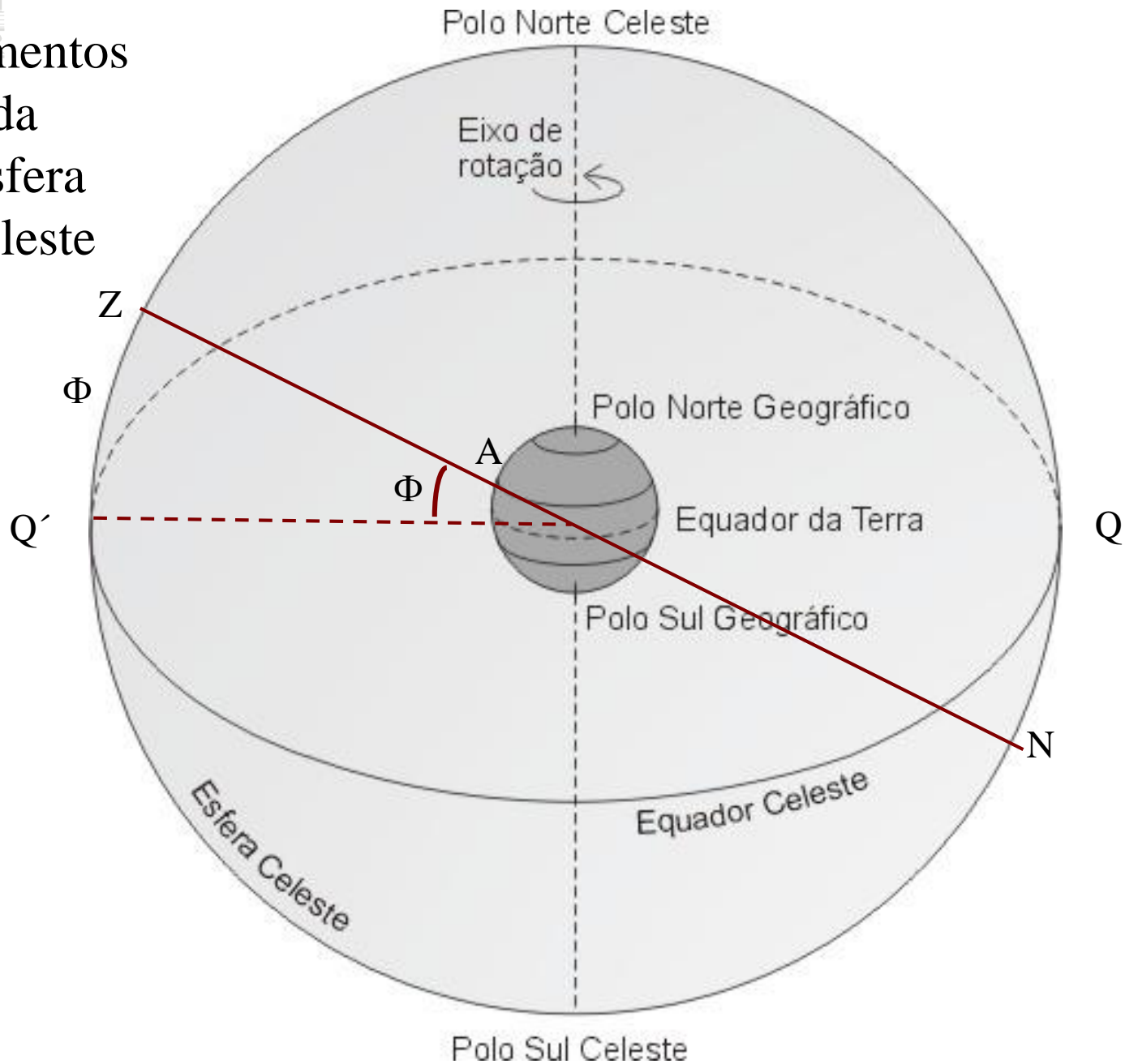
Identificação de Estrelas no Céu

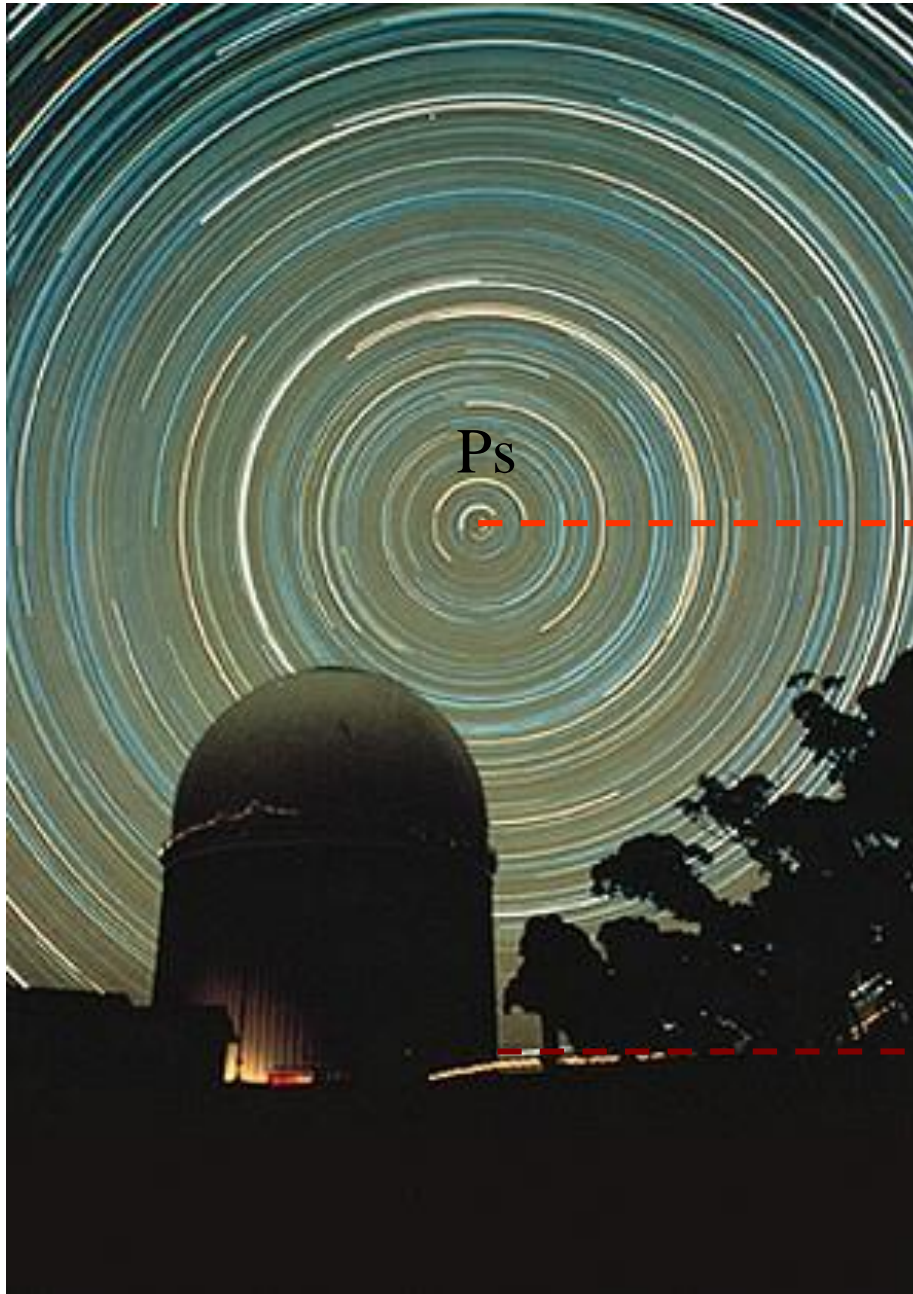


Identificação de estrelas



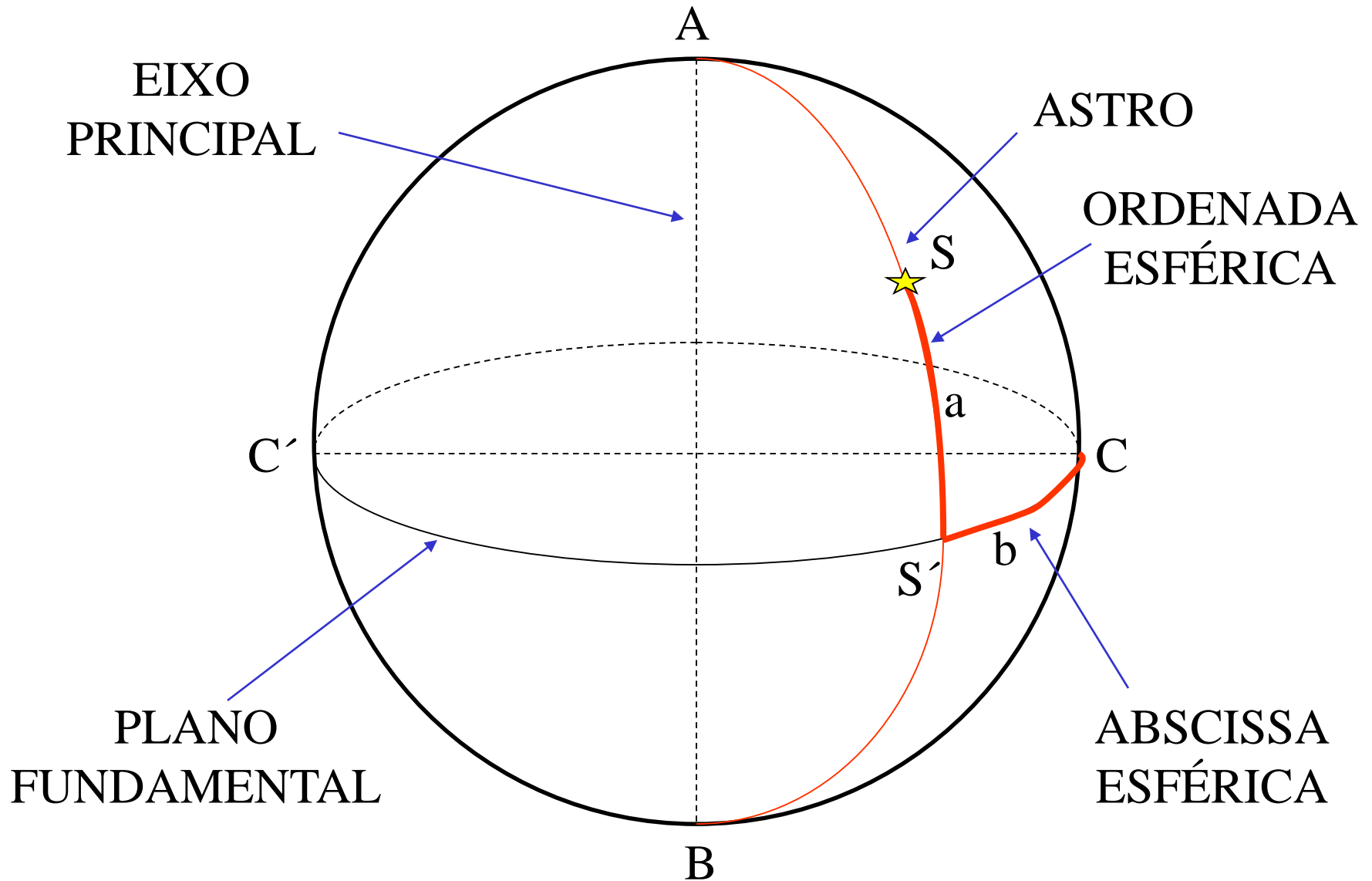
Elementos da Esfera Celeste

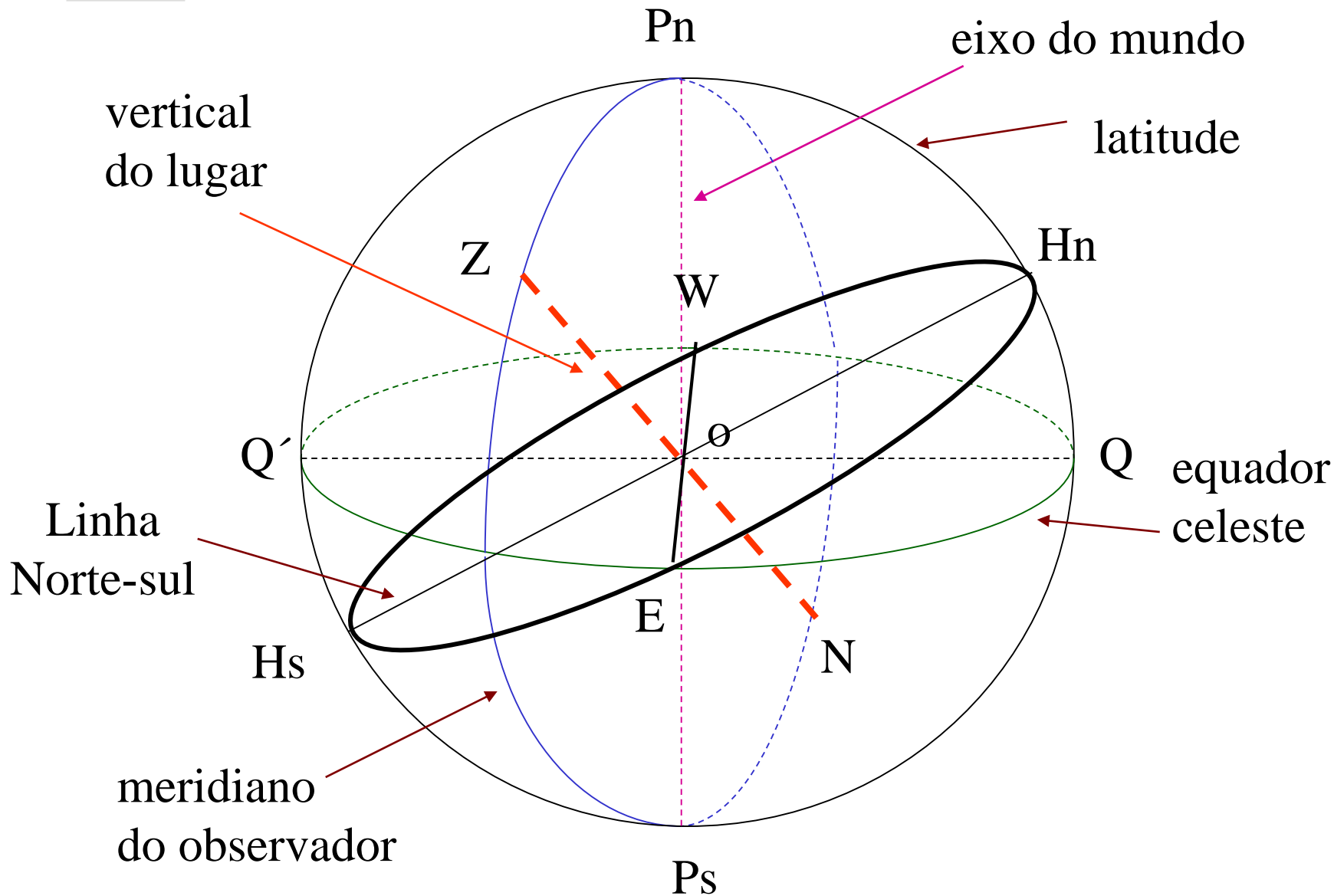


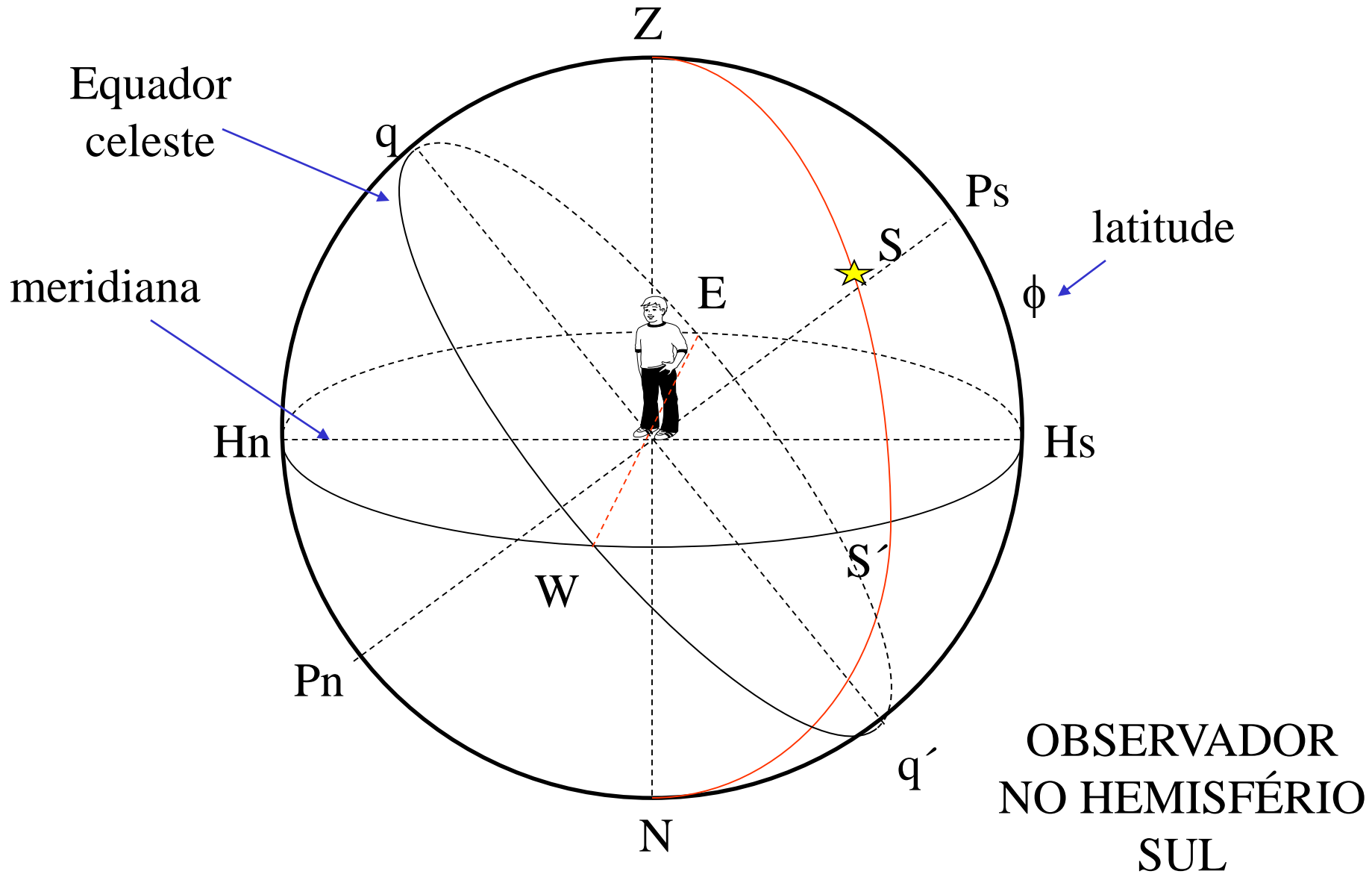


Determinação dos pólos celestes por observações à estrelas circunpolares

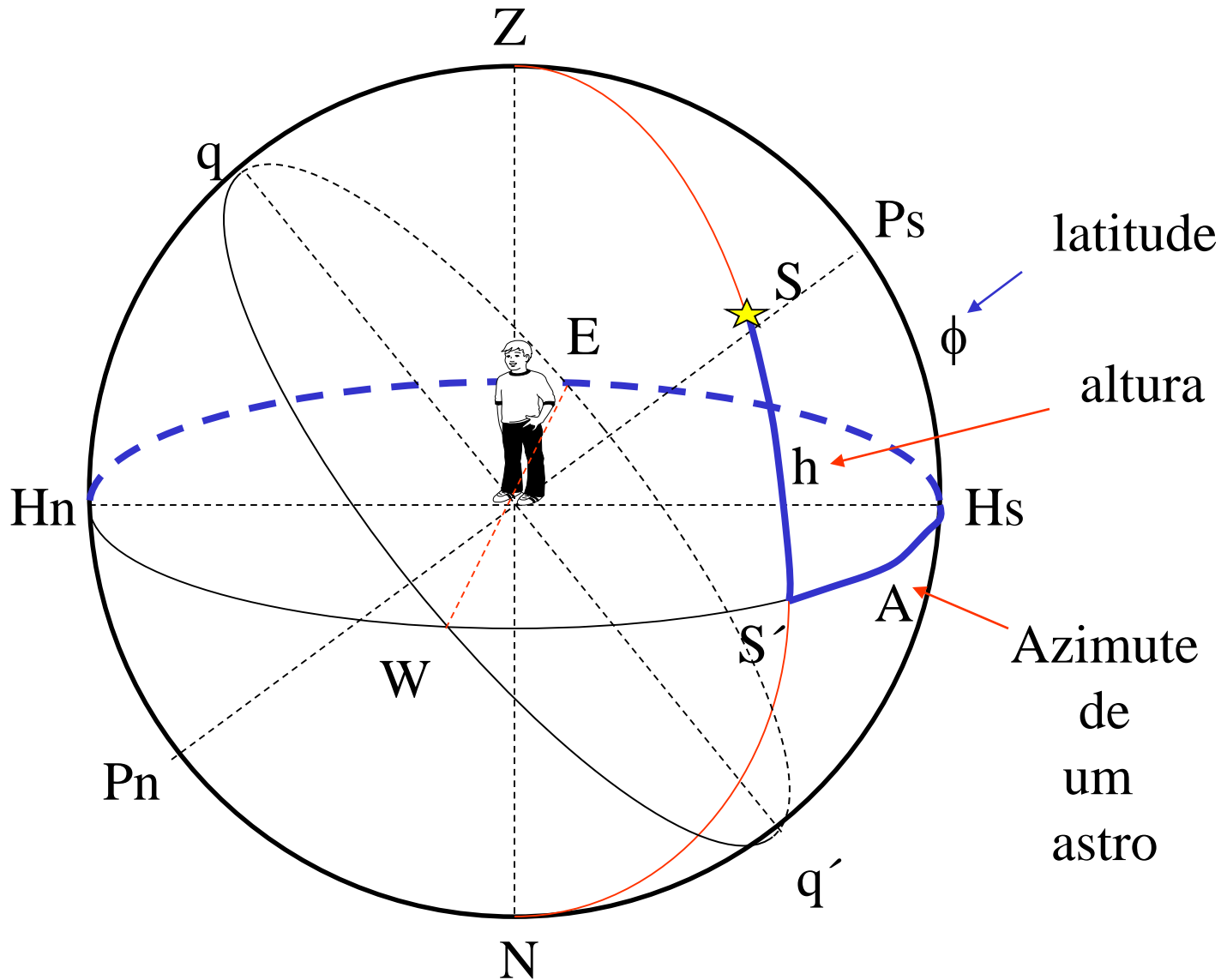
Latitude do lugar



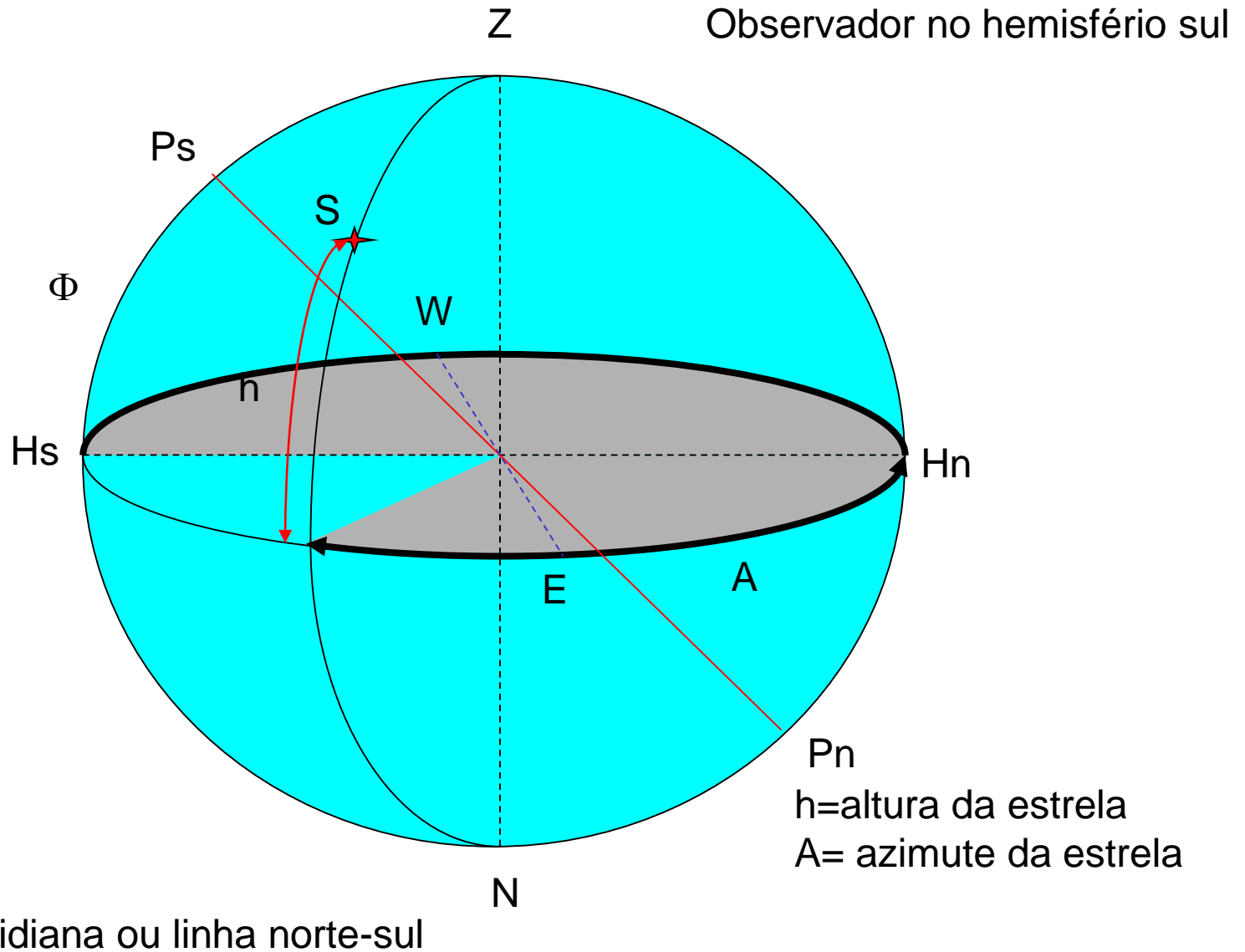




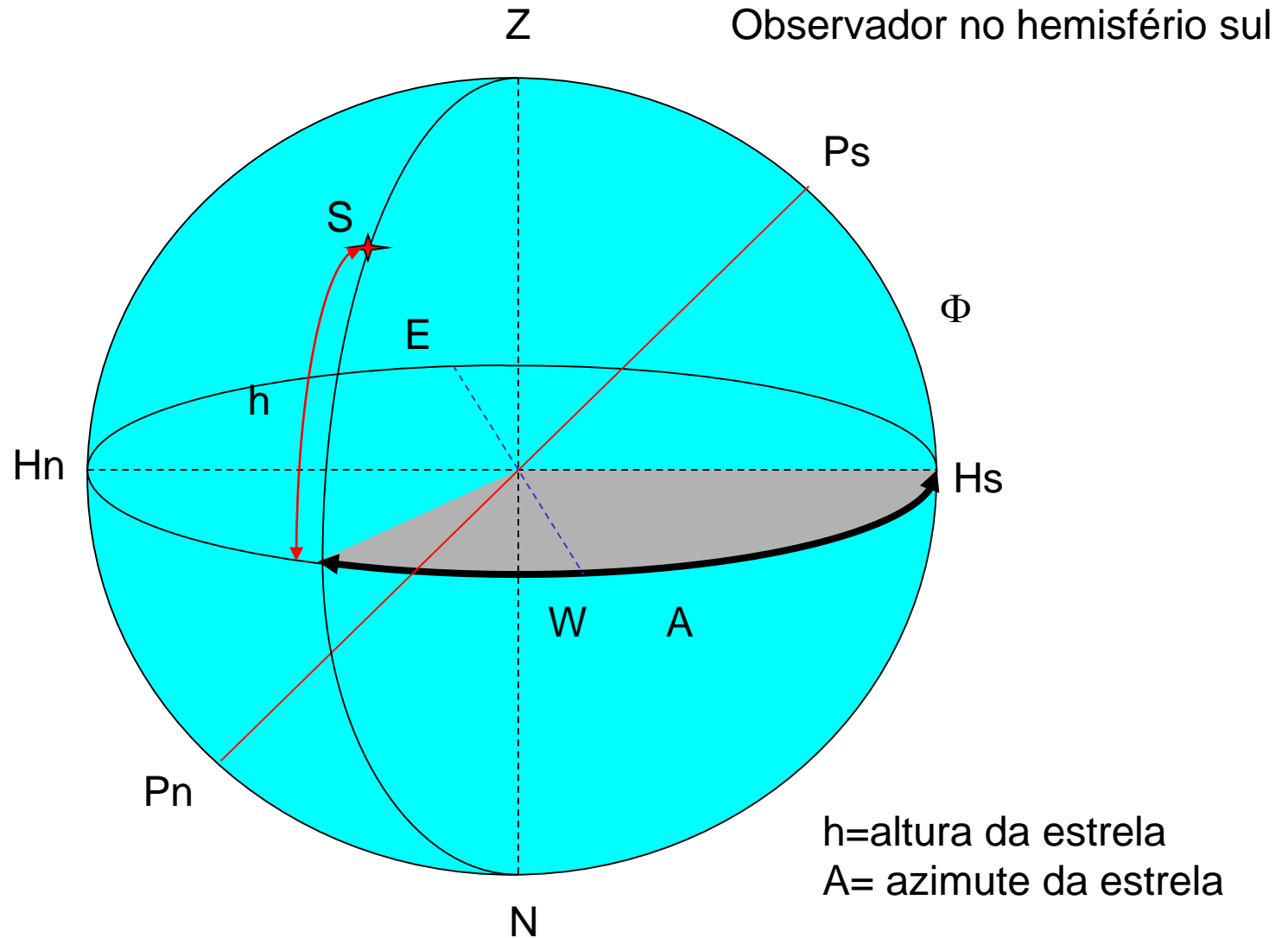
SISTEMA DE COORDENADAS HORIZONTAIS



Sistema de coordenadas horizontais



Sistema de coordenadas horizontais

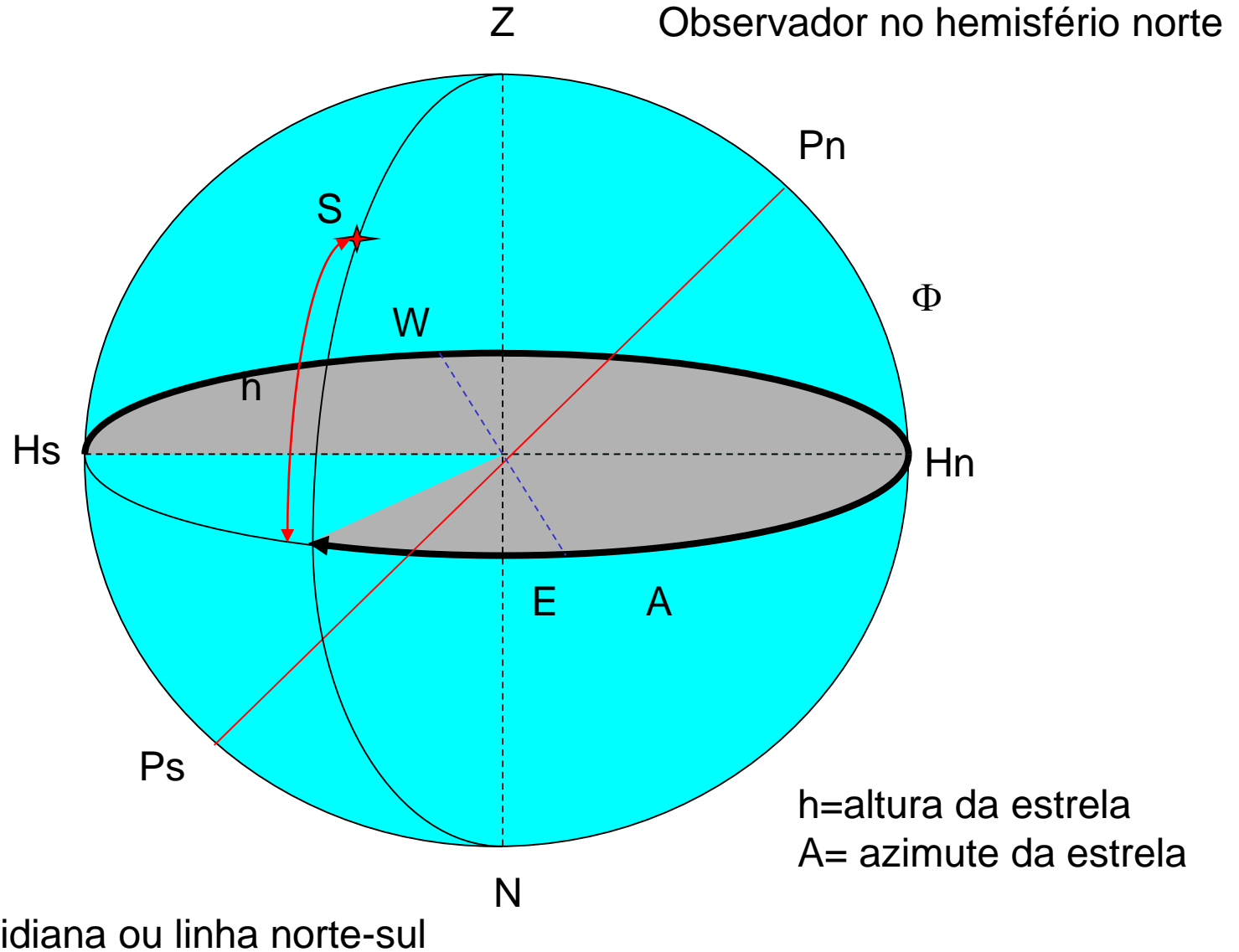


Observador no hemisfério sul

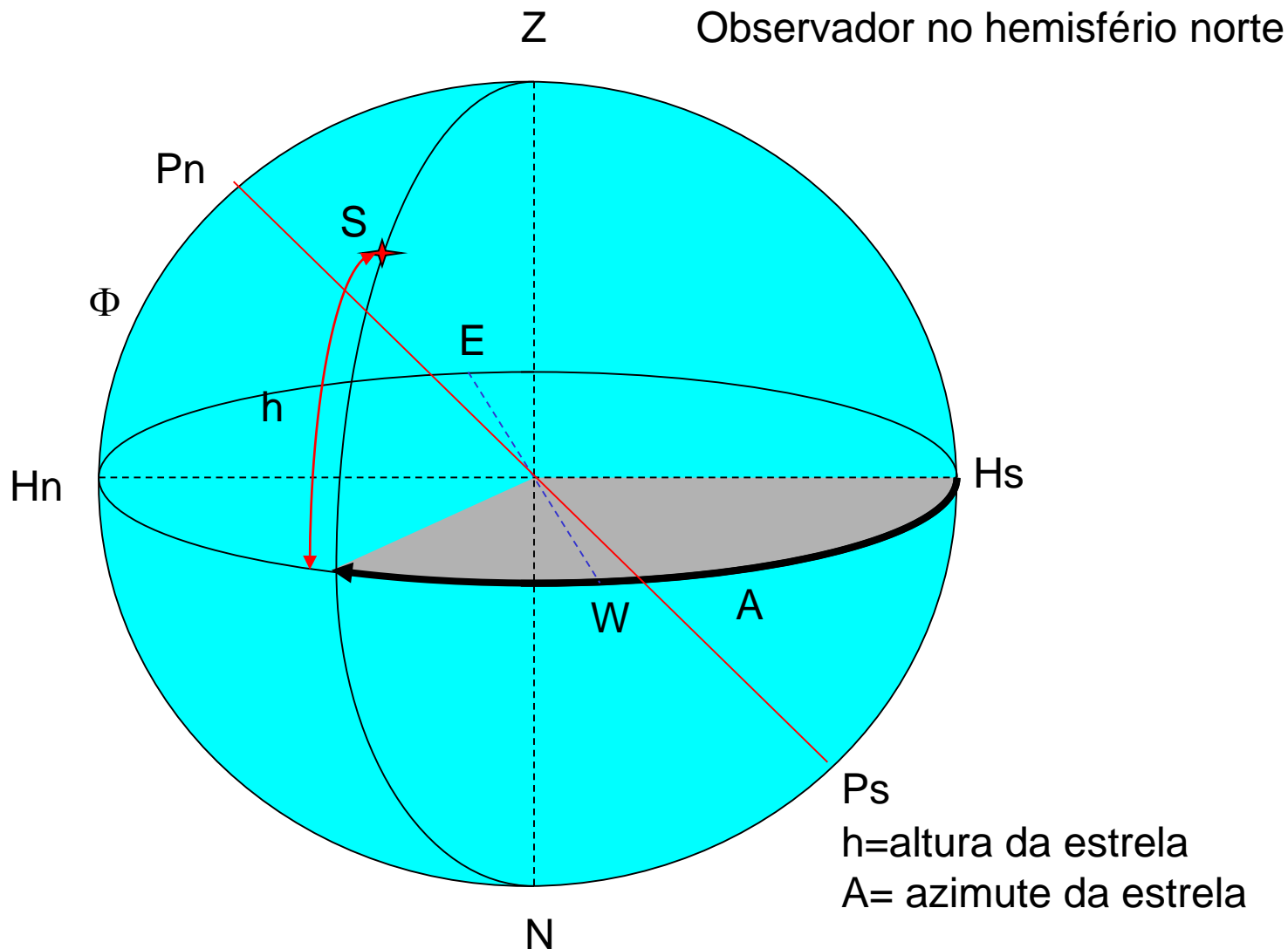
h =altura da estrela
 A = azimute da estrela

Hn-Hs meridiana ou linha norte-sul

Sistema de coordenadas horizontais



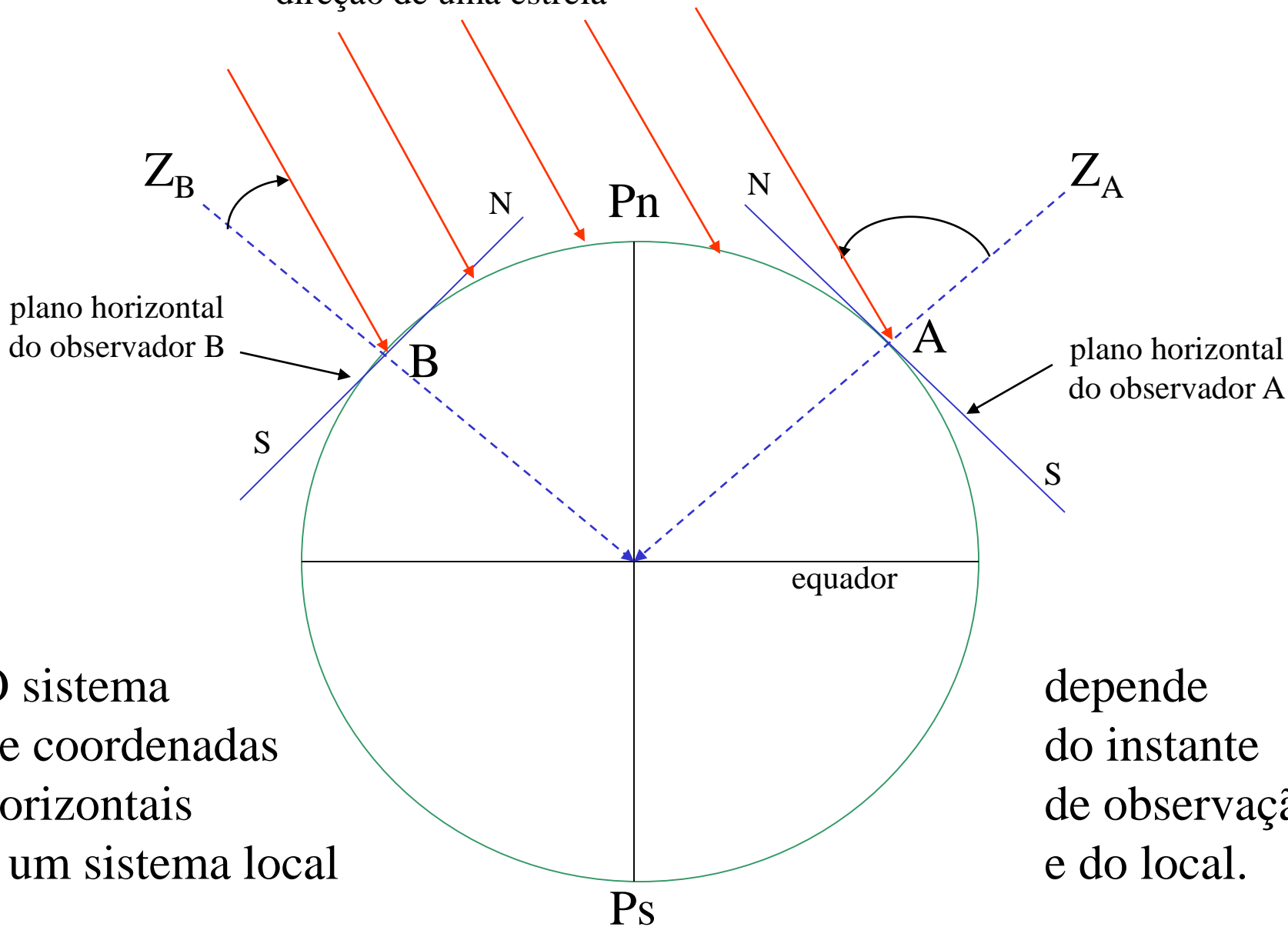
Sistema de coordenadas horizontais



Hn-Hs meridiana ou linha norte-sul

Observação de uma estrela em diferentes locais da Terra

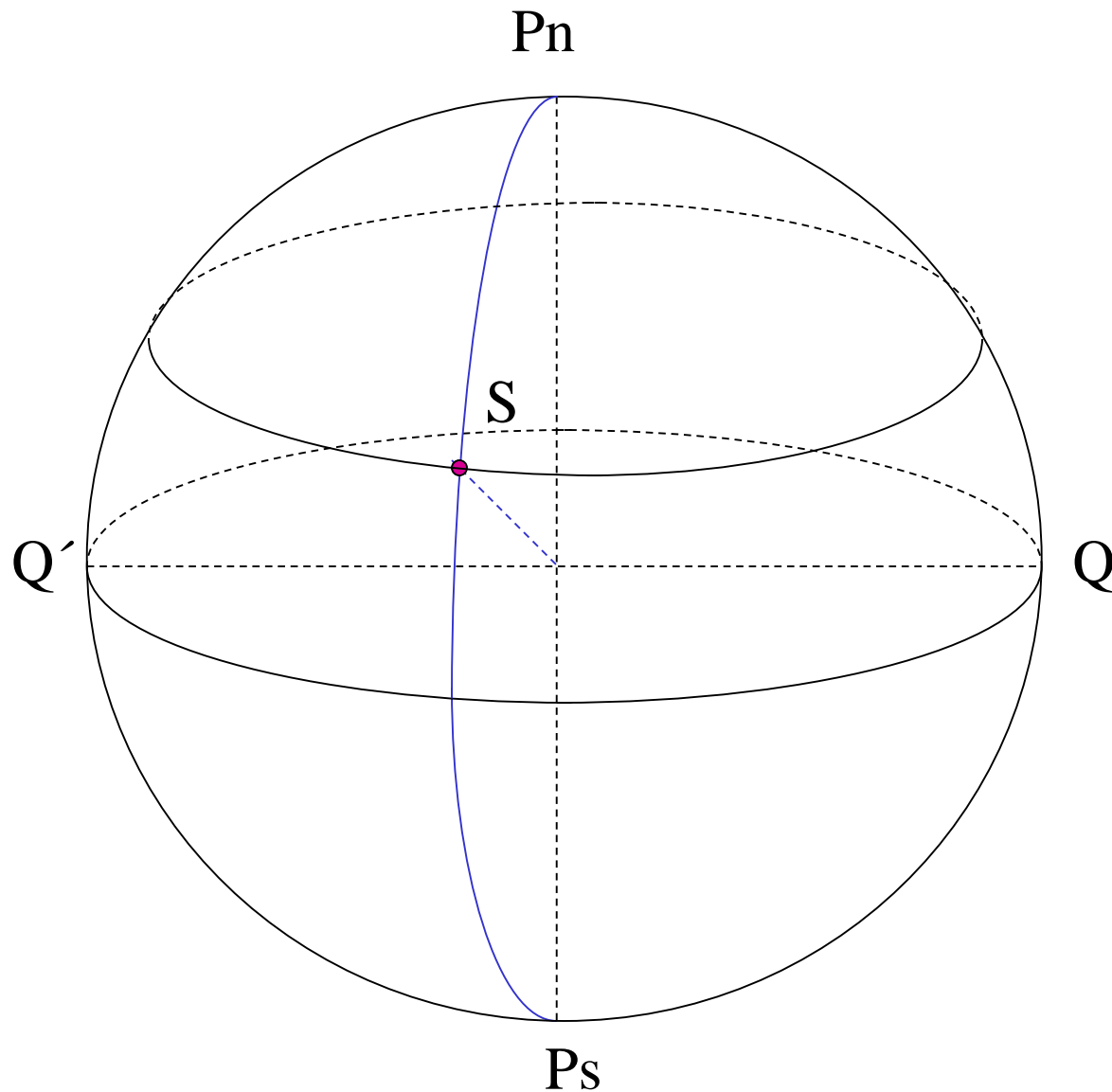
direção de uma estrela

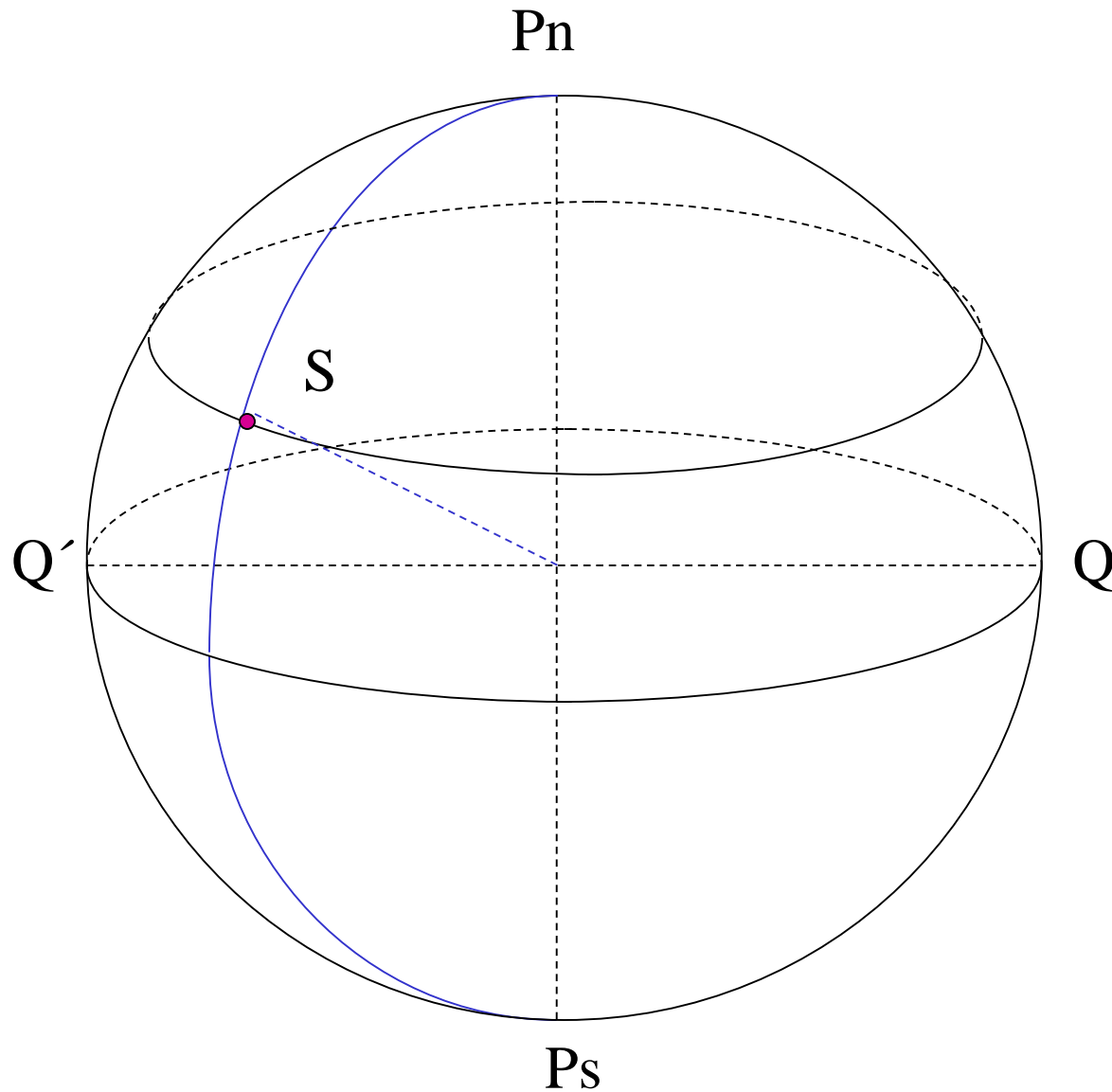


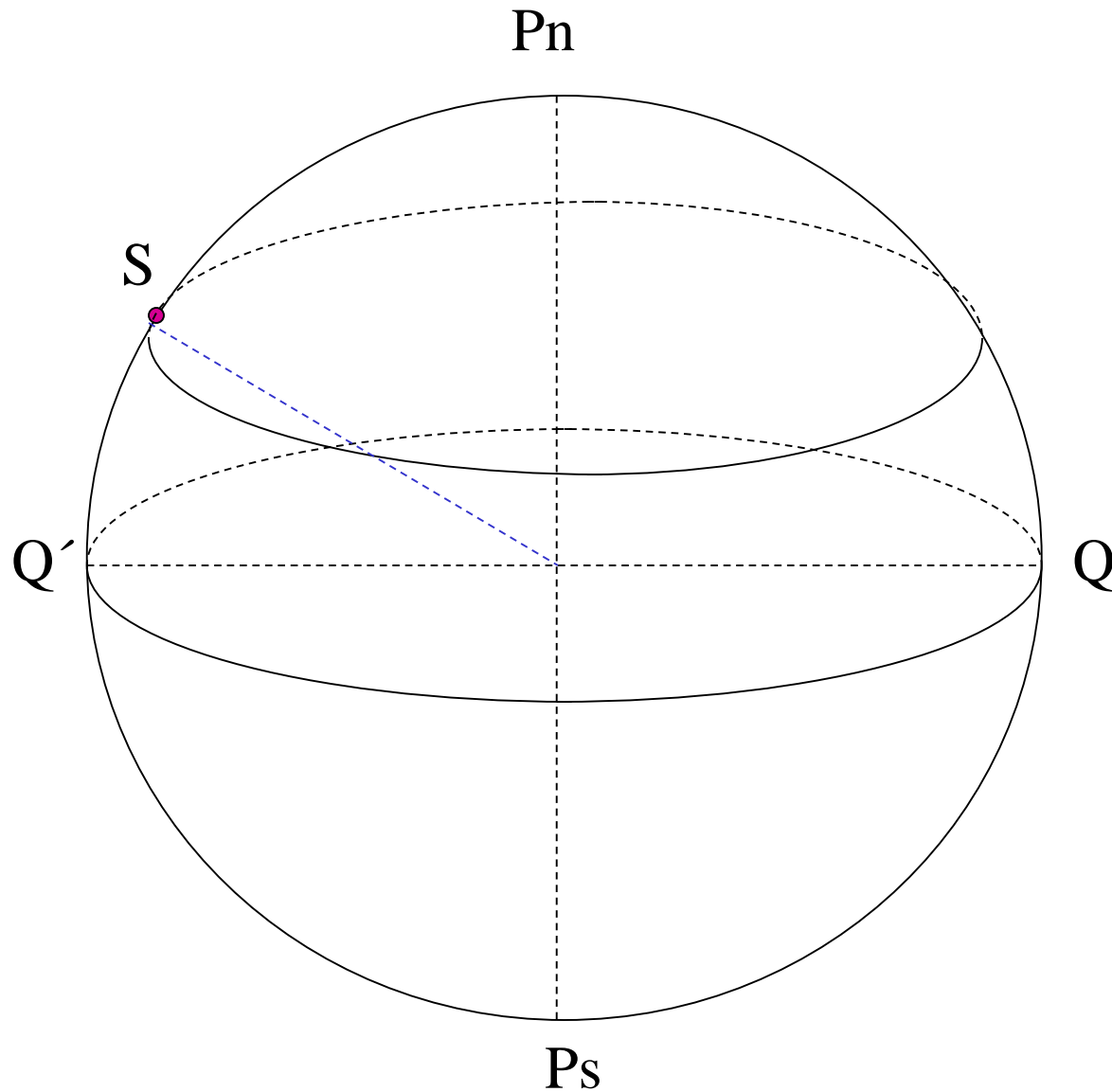
O sistema de coordenadas horizontais é um sistema local

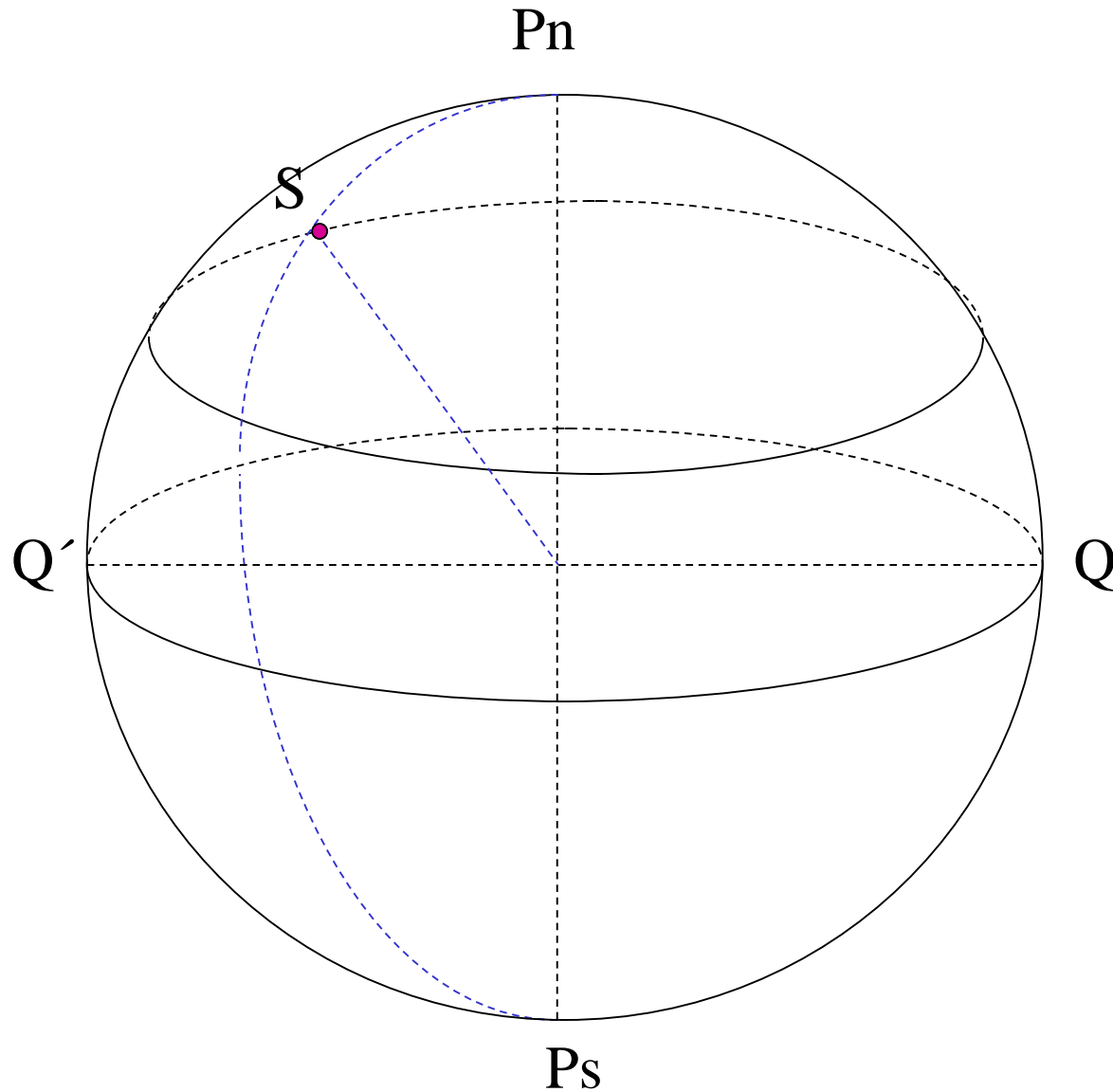
depende do instante de observação e do local.

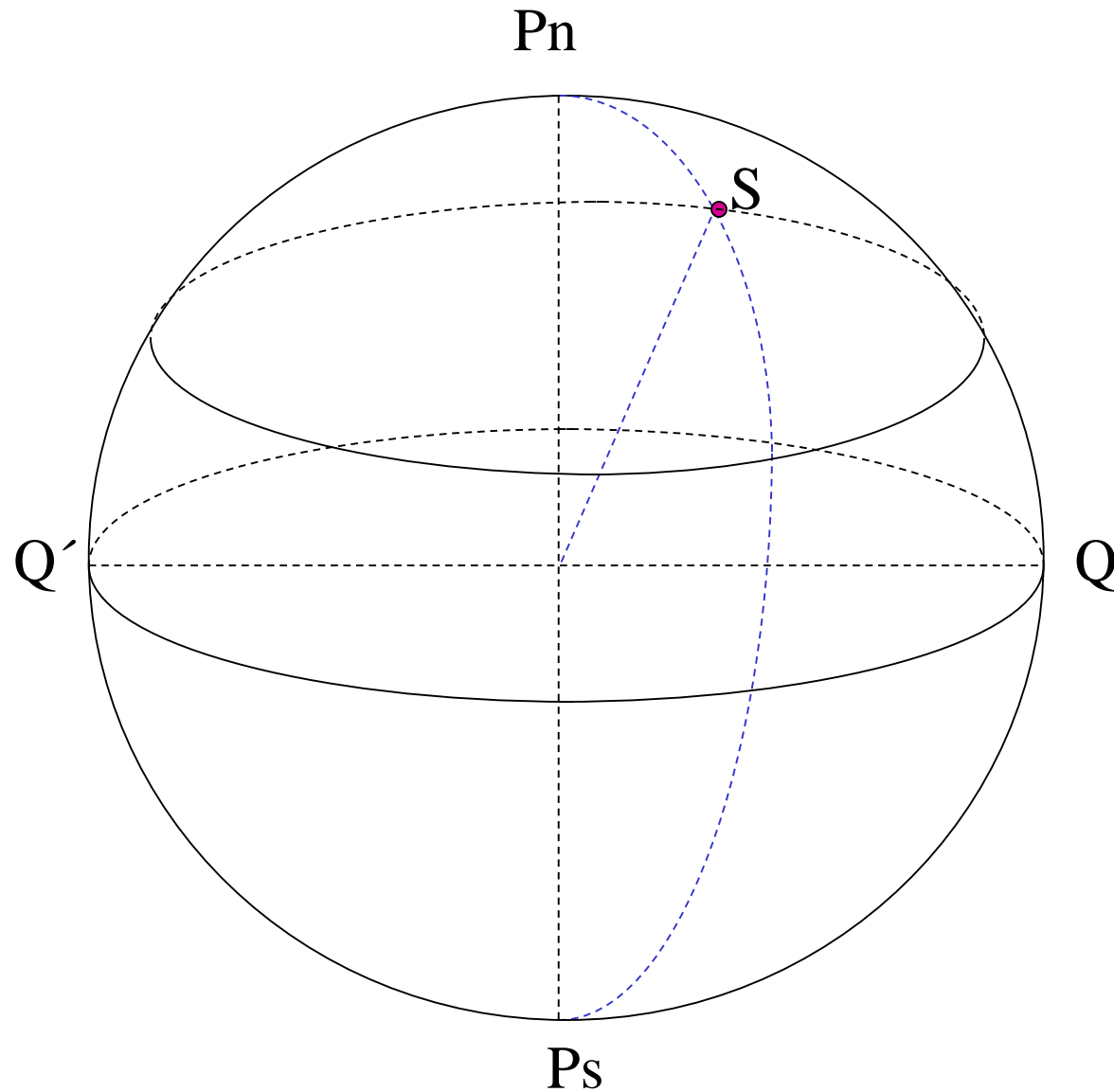
Movimento diário de uma estrela na esfera celeste

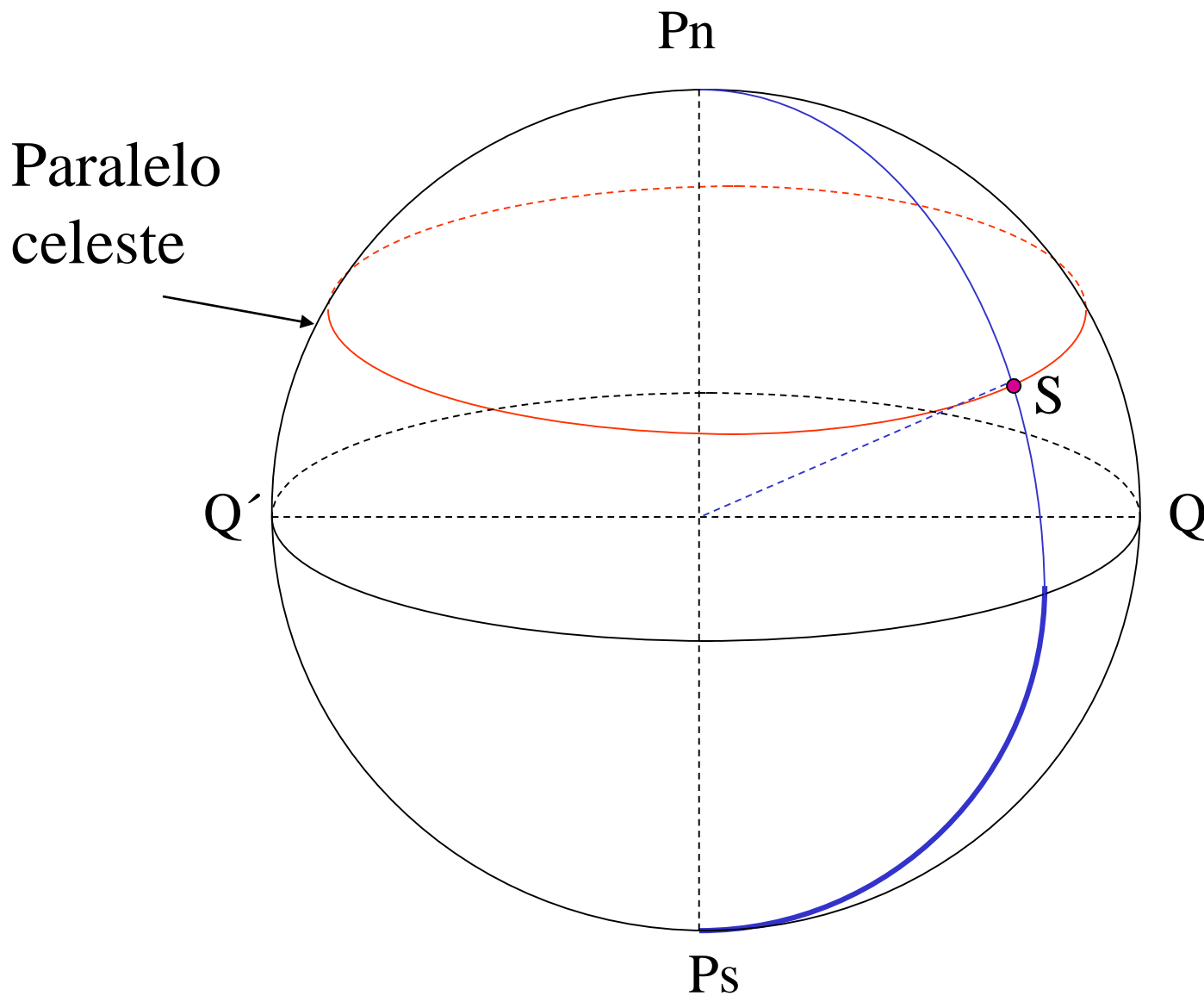




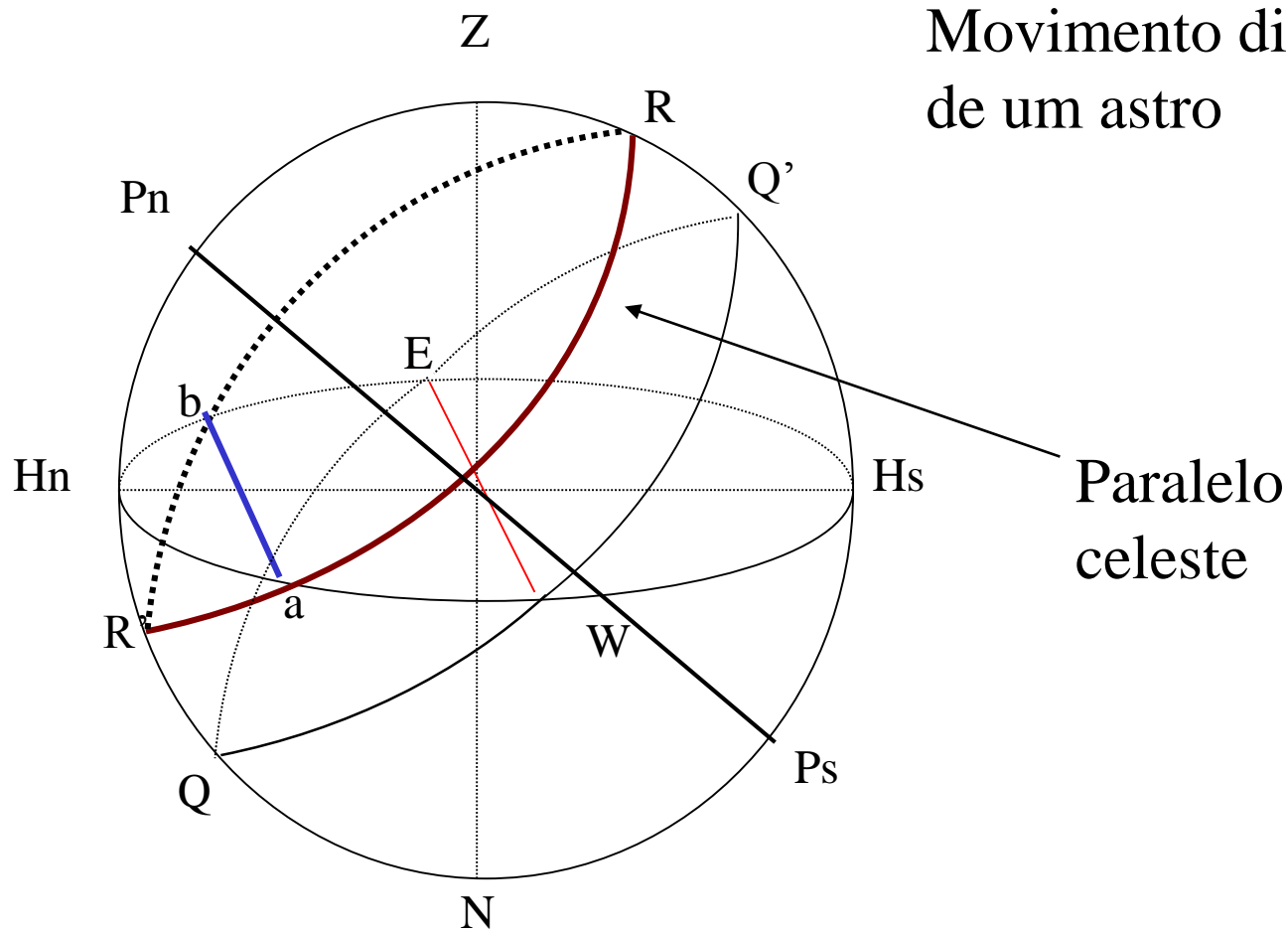




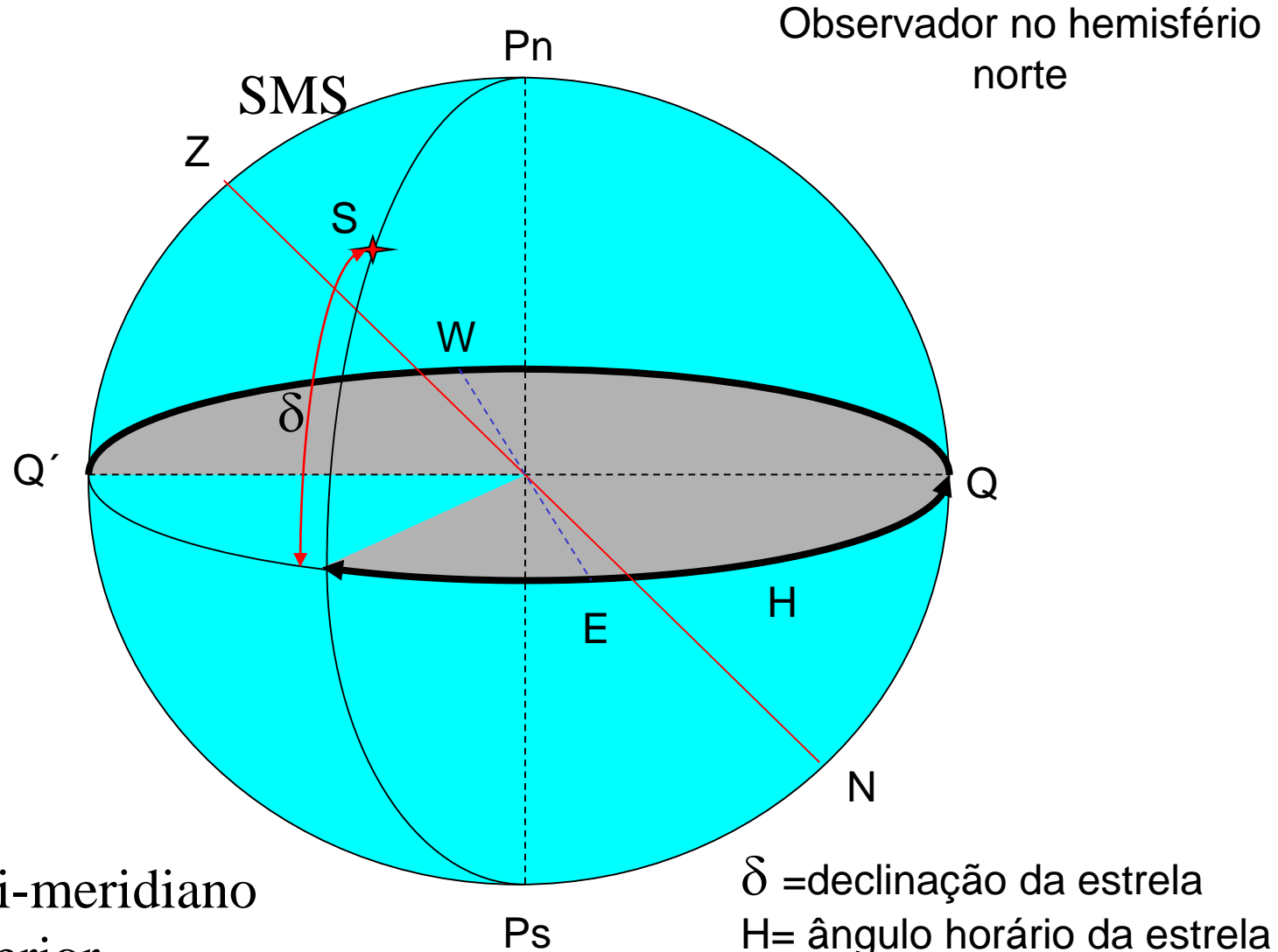




Movimento diurno de um astro



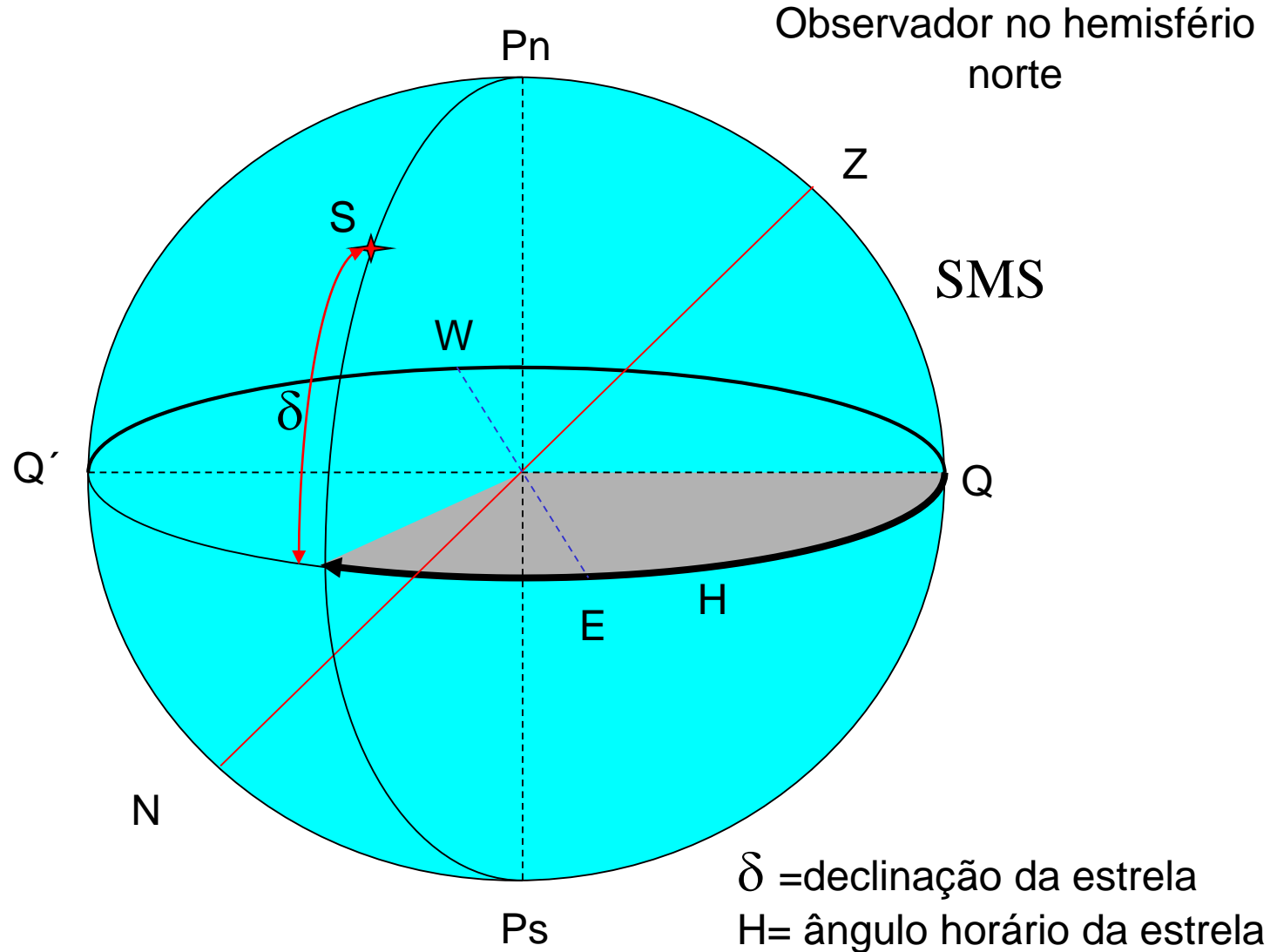
Sistema de coordenadas horárias



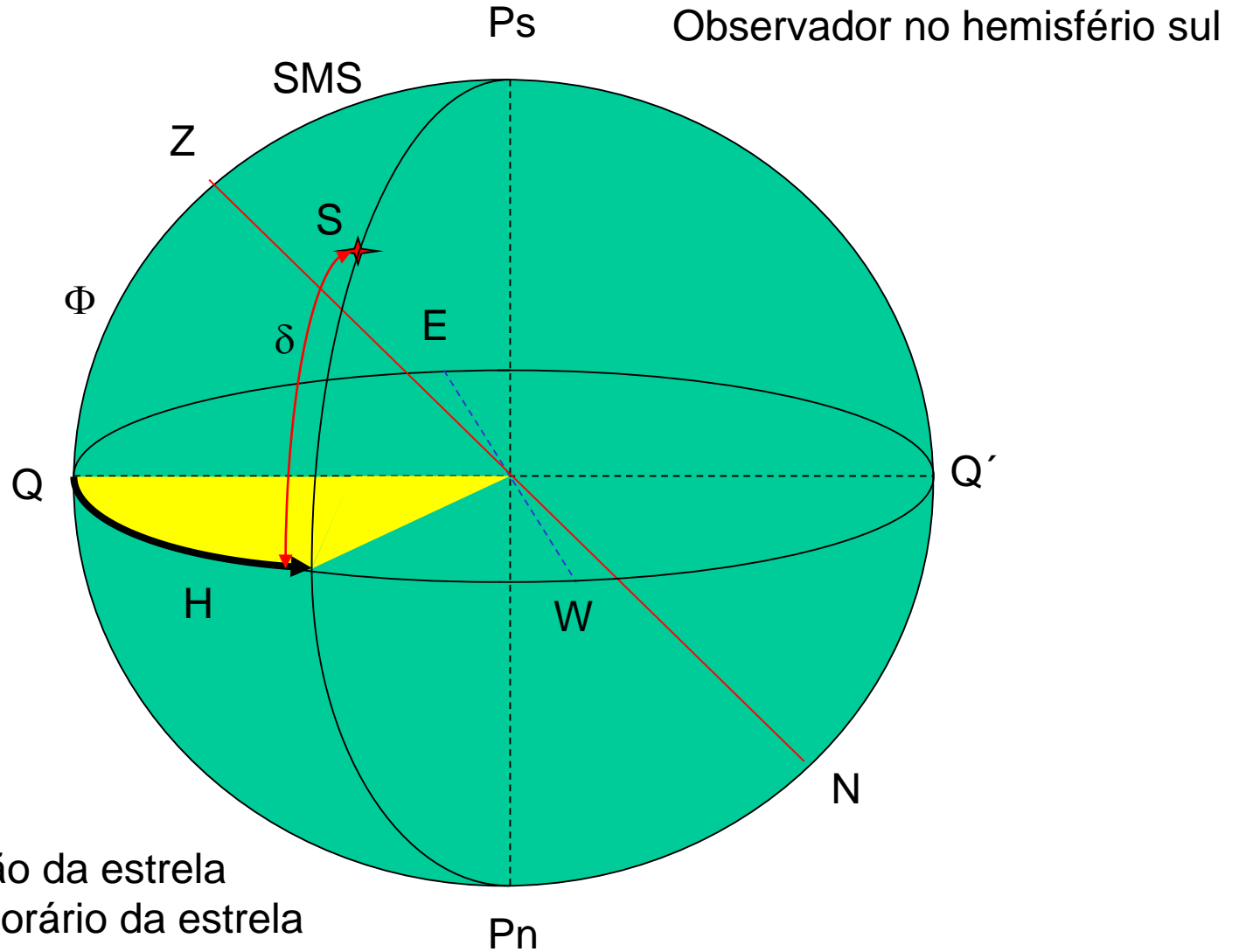
SMS= semi-meridiano superior

δ =declinação da estrela
H= ângulo horário da estrela

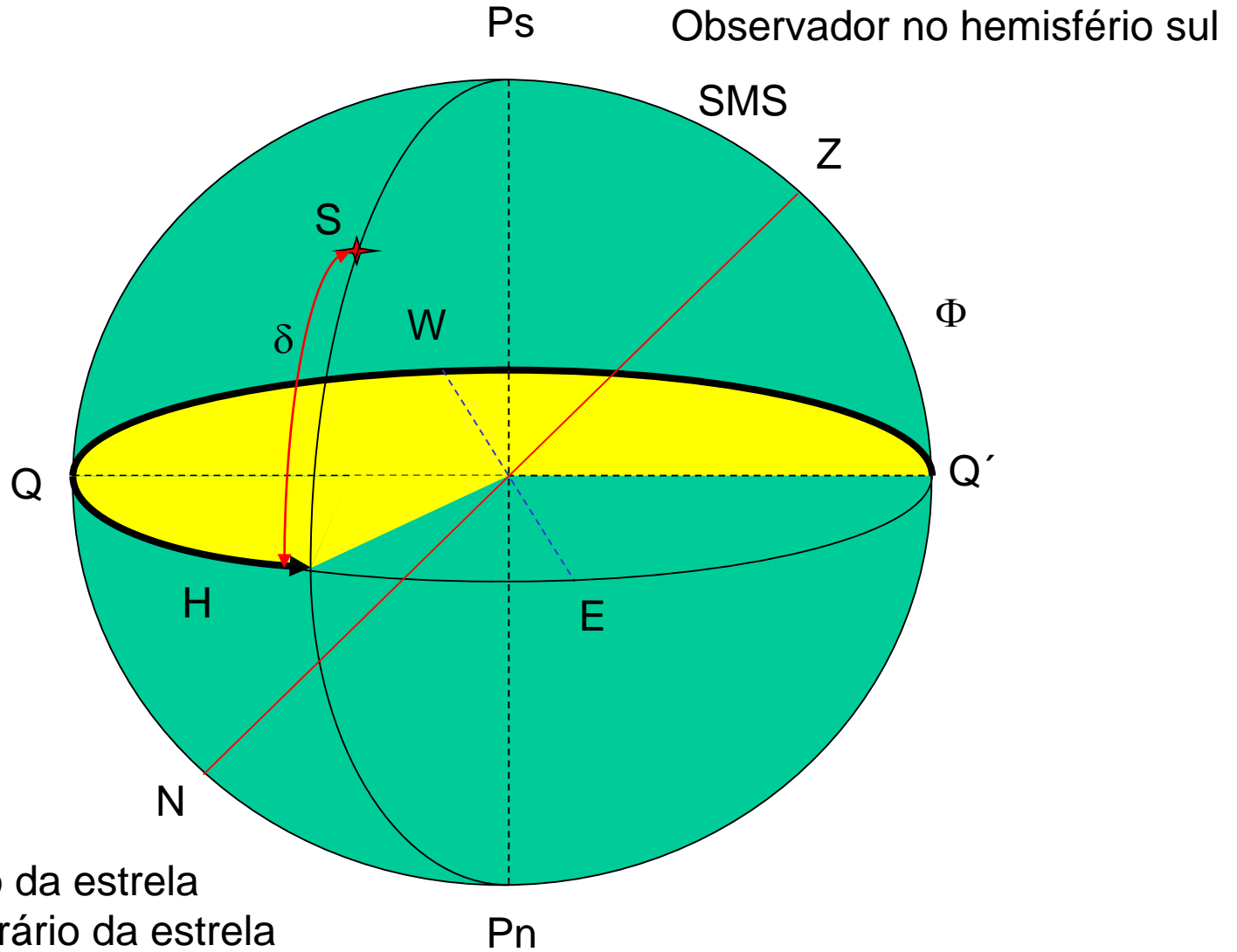
Sistema de coordenadas horárias



Sistema de coordenadas horárias



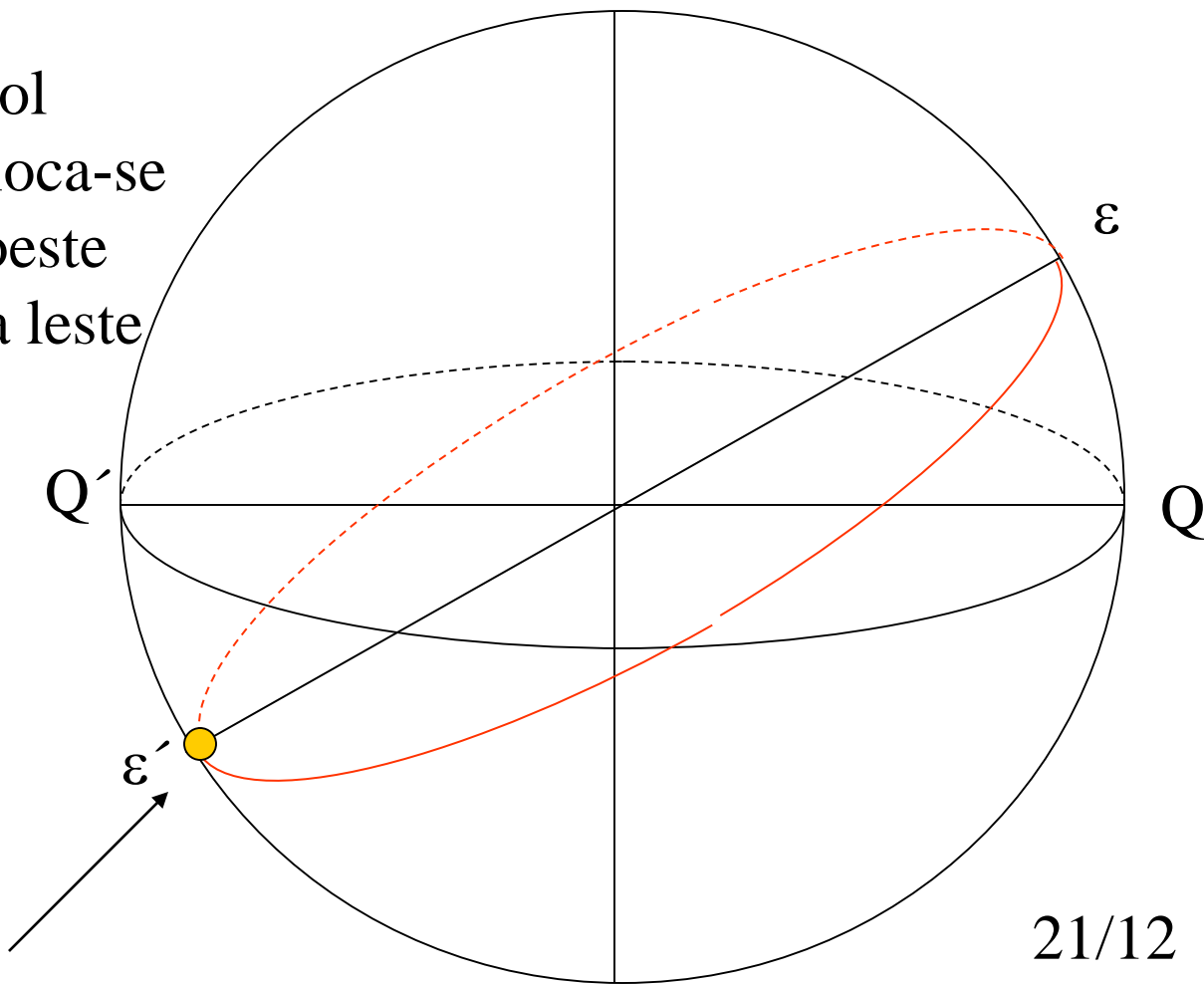
Sistema de coordenadas horárias



Movimento do Sol na eclíptica

P_n

O Sol
desloca-se
de oeste
para leste

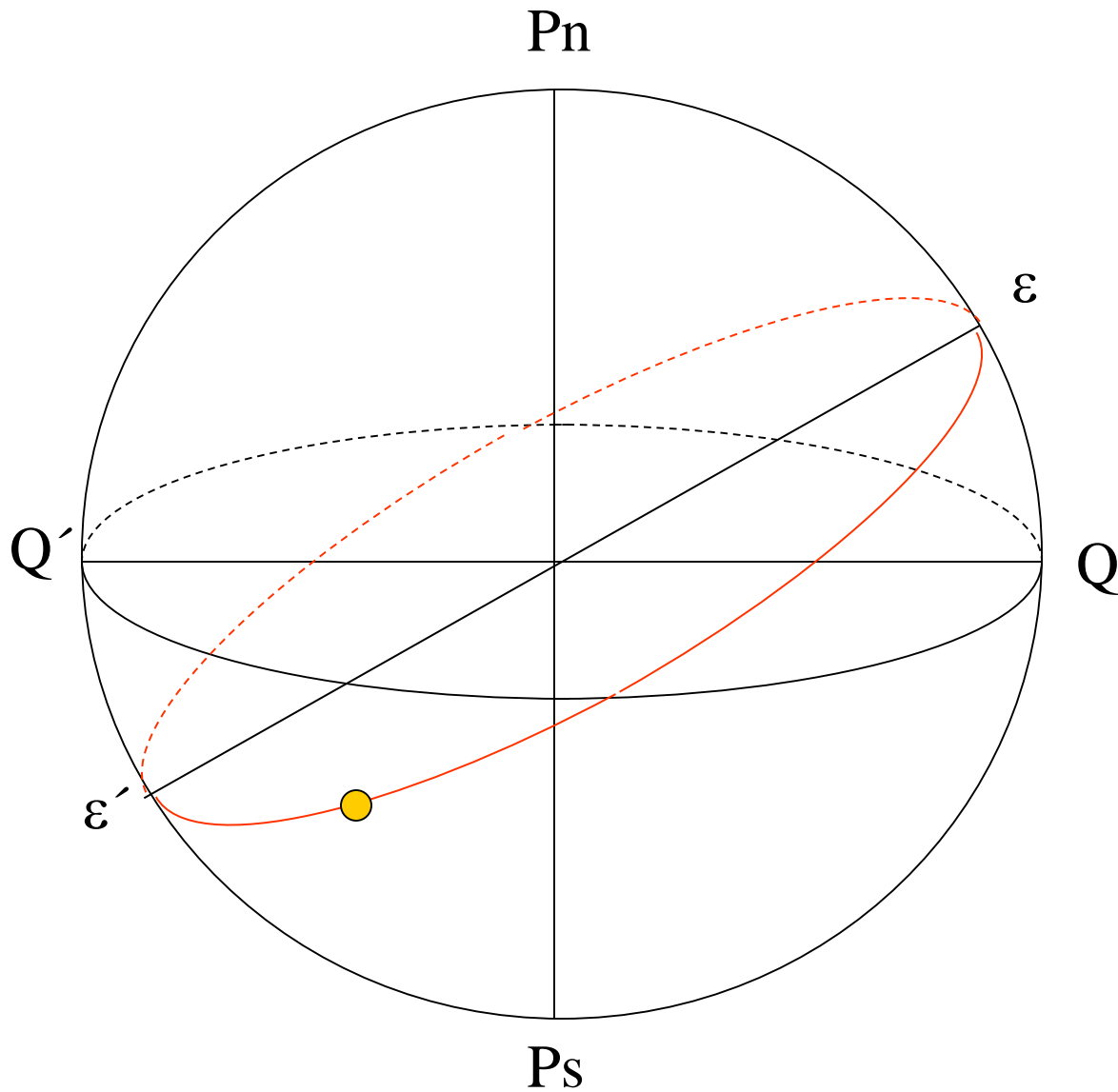


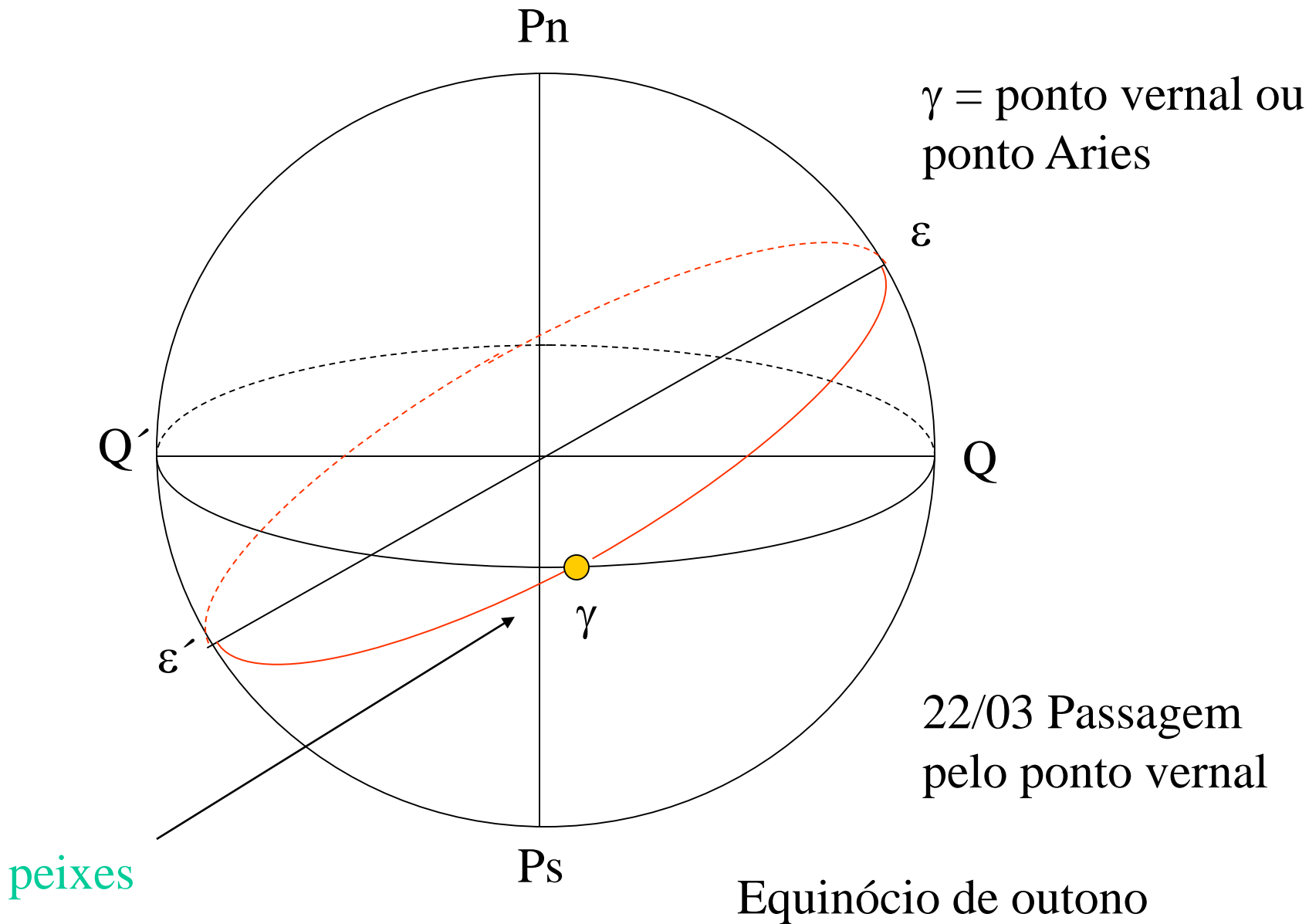
21/12

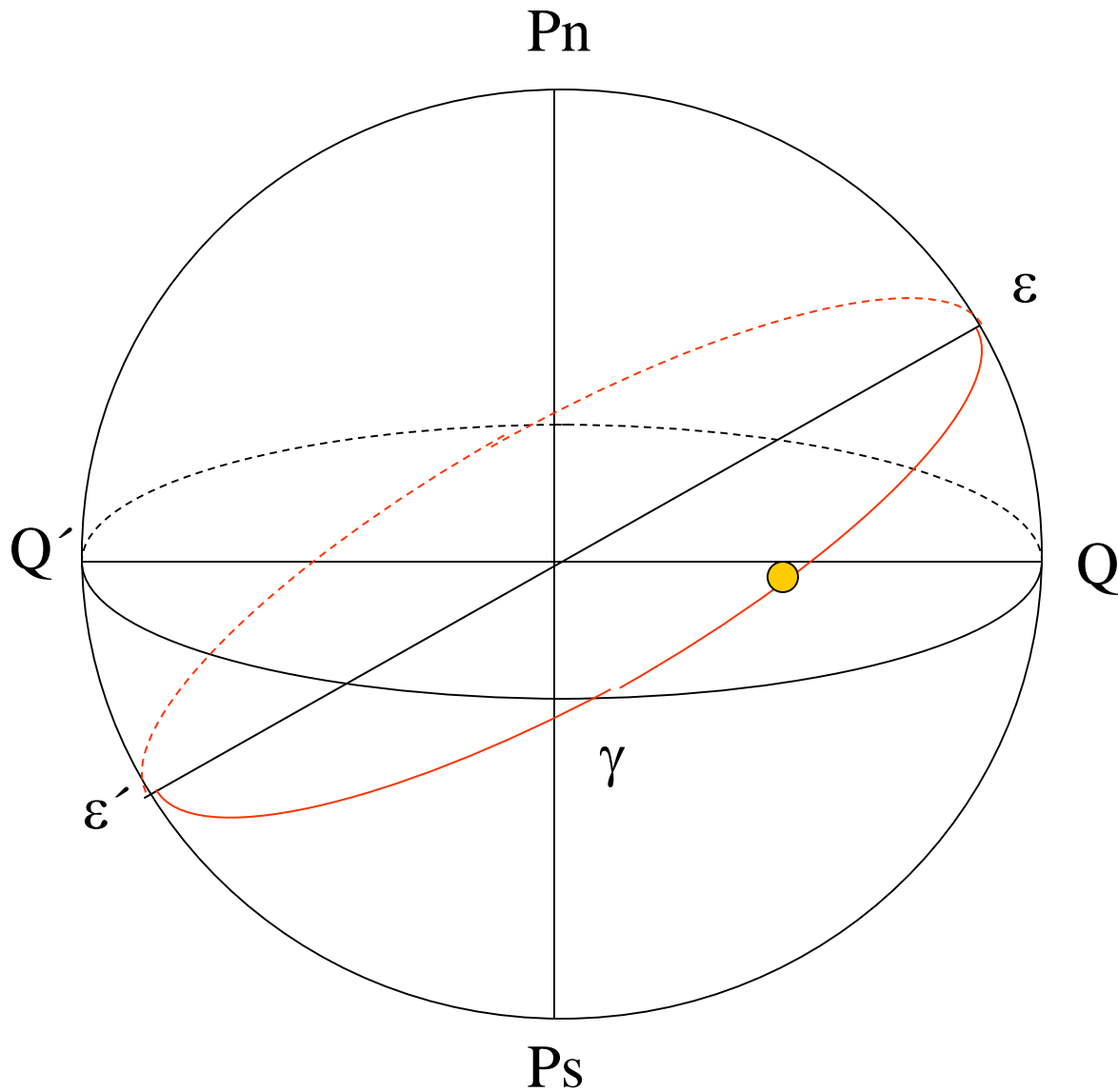
solstício de verão

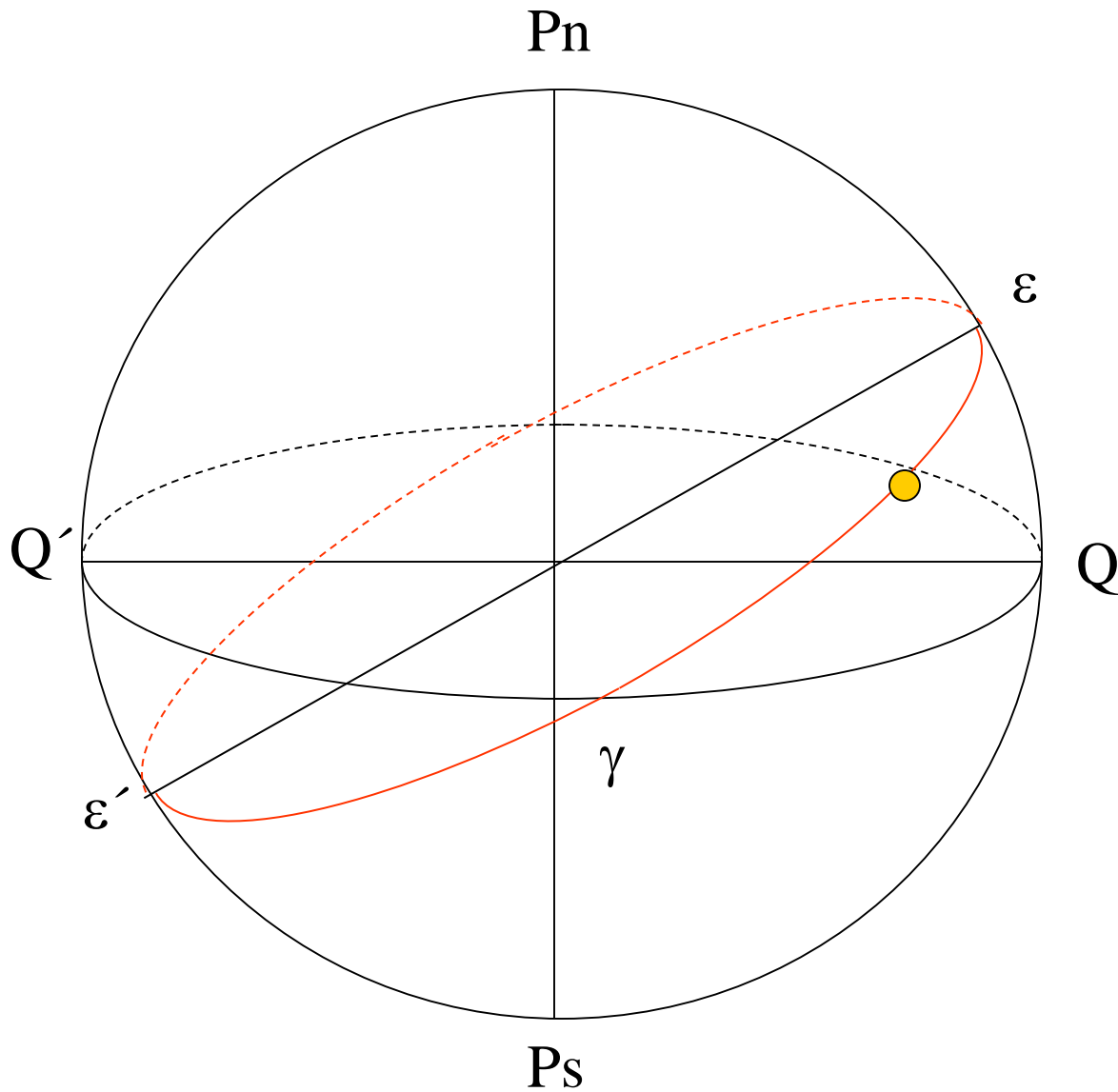
P_s

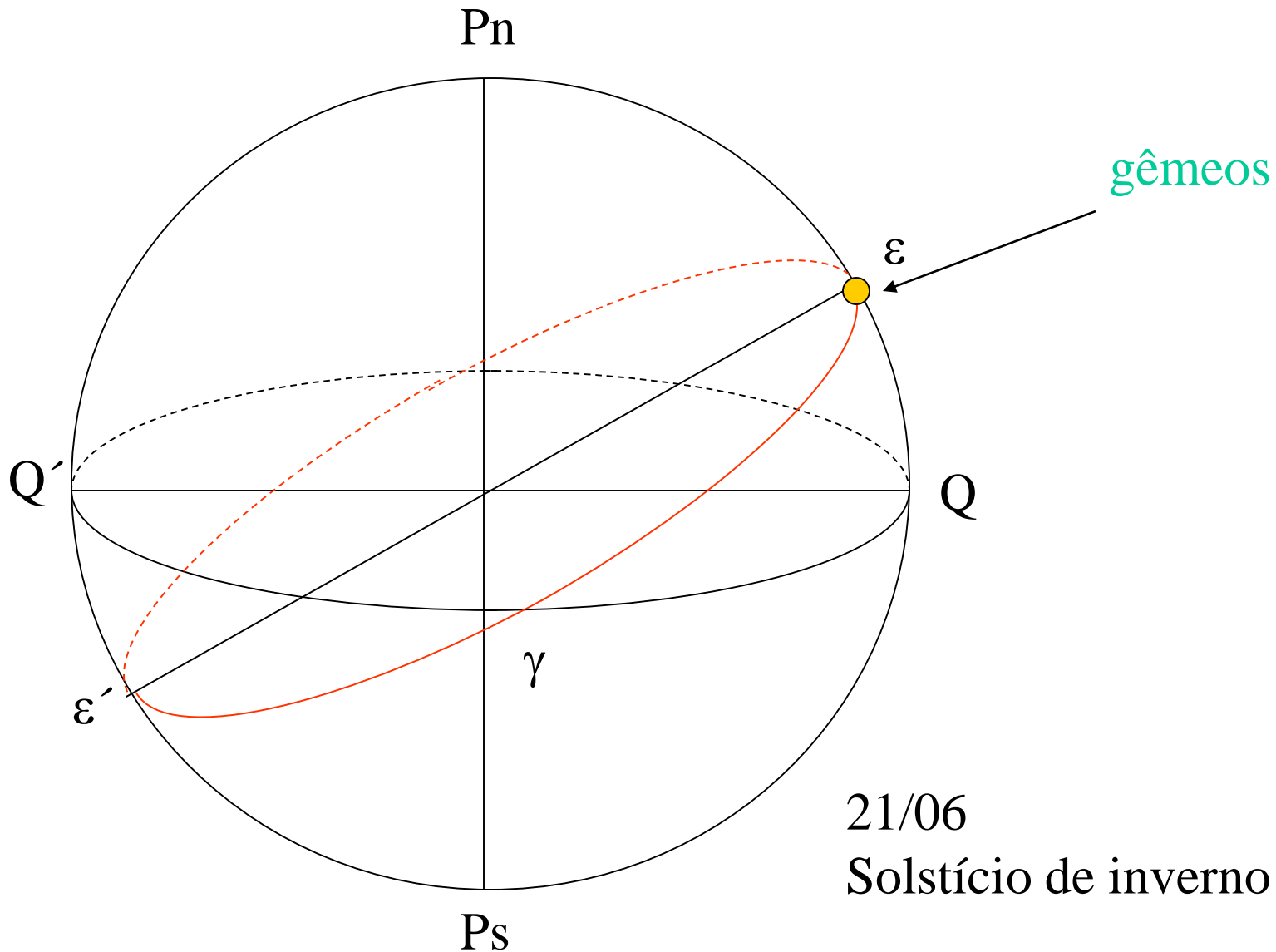
sagitário

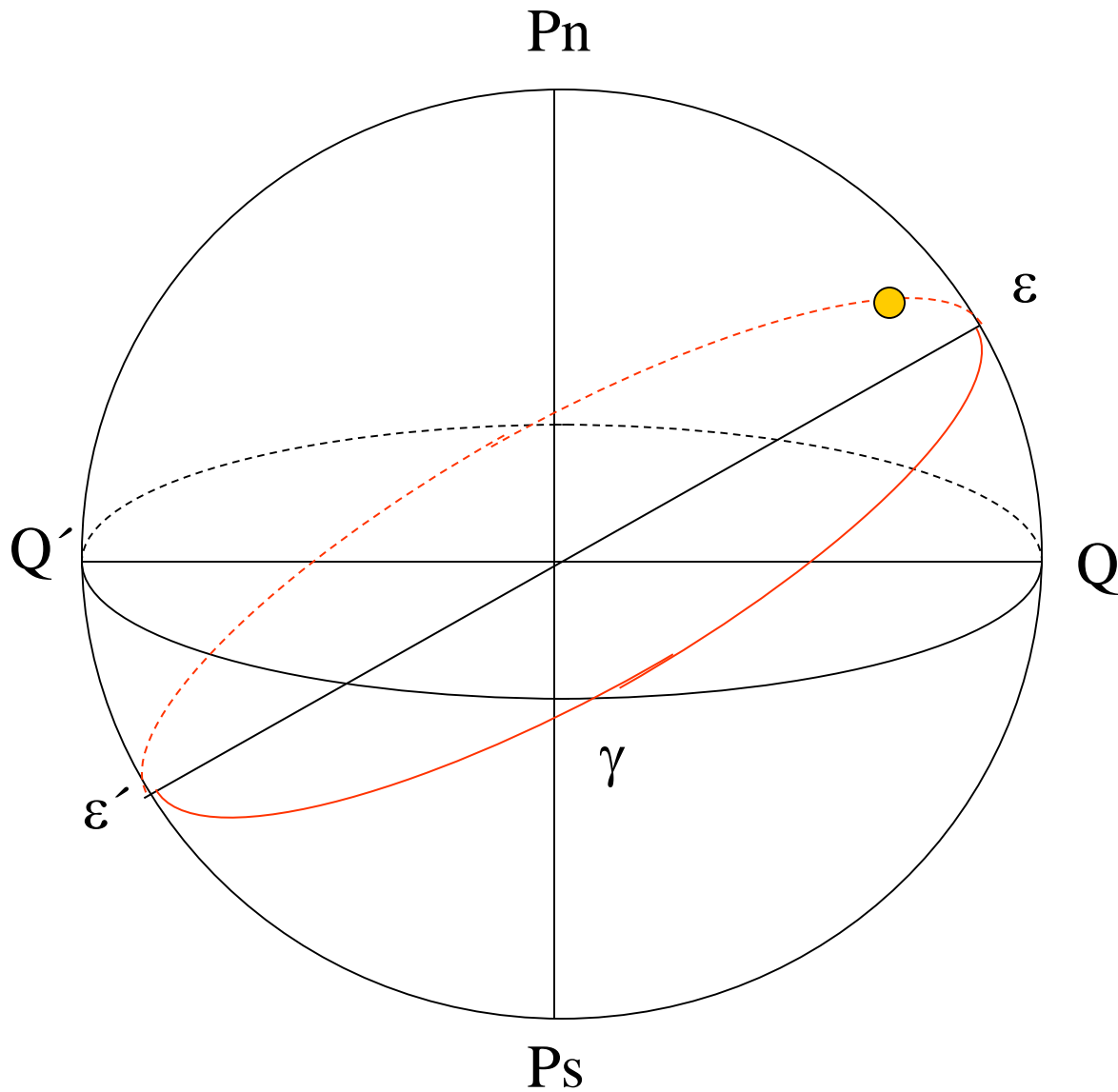


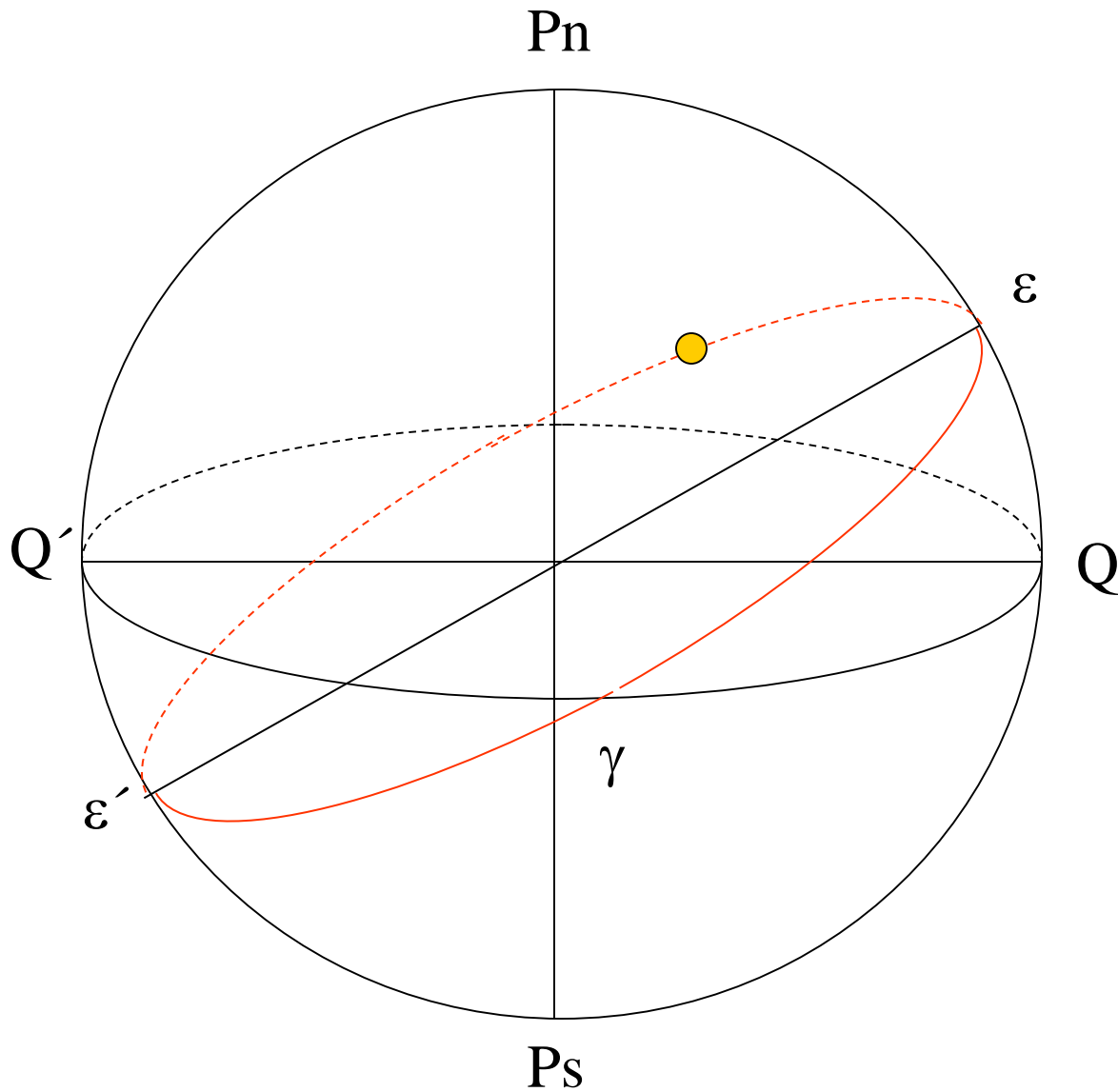


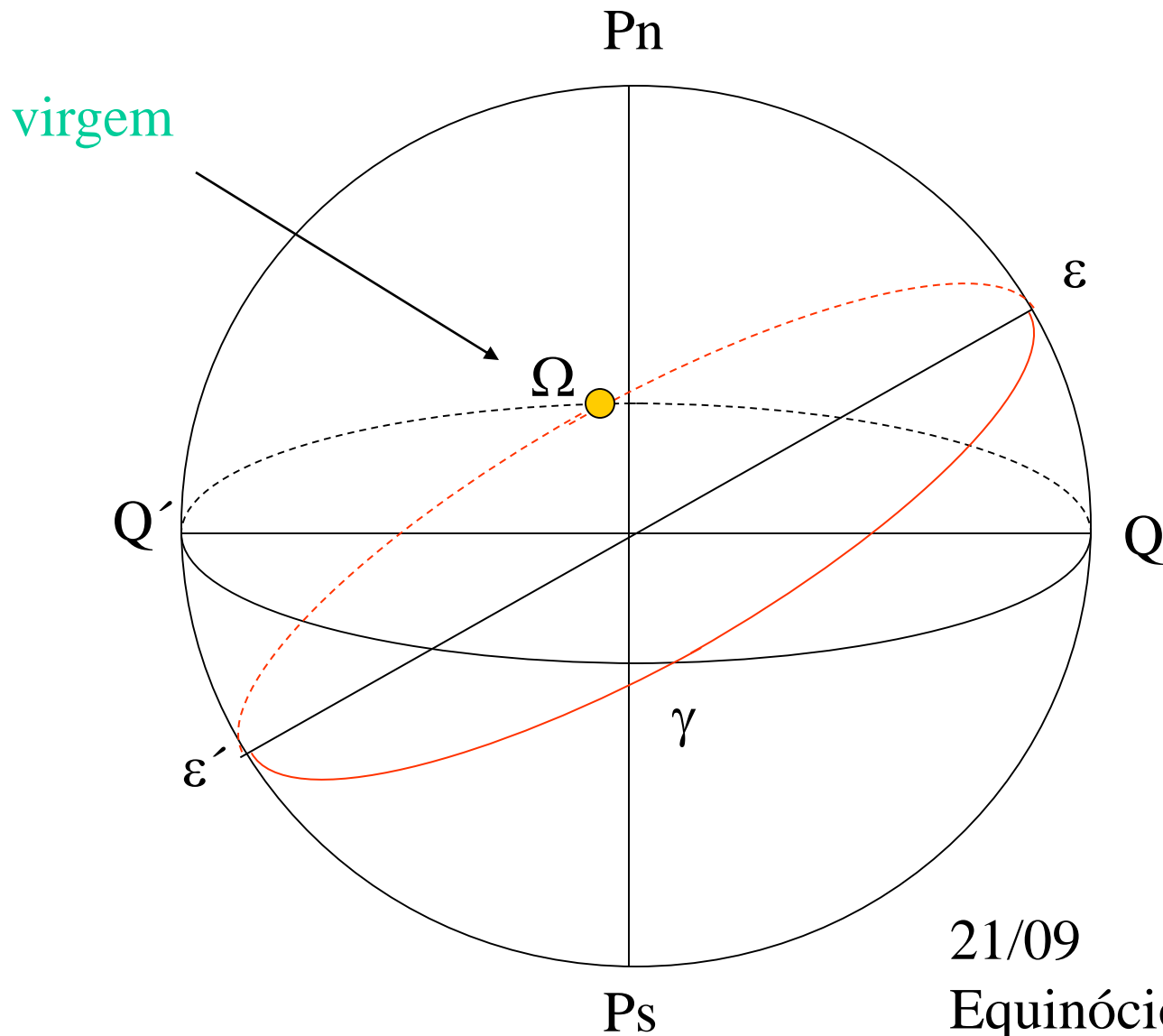


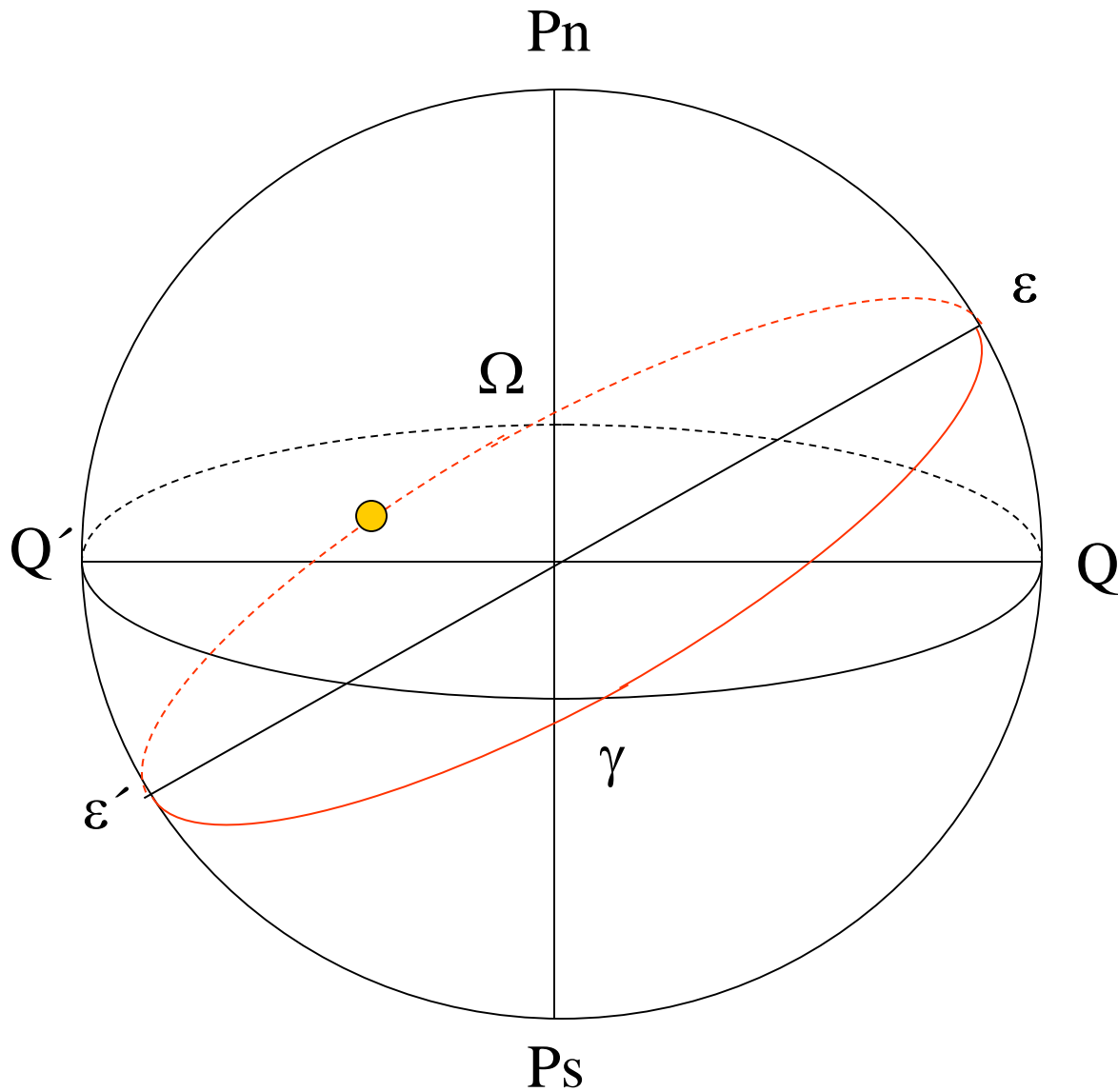


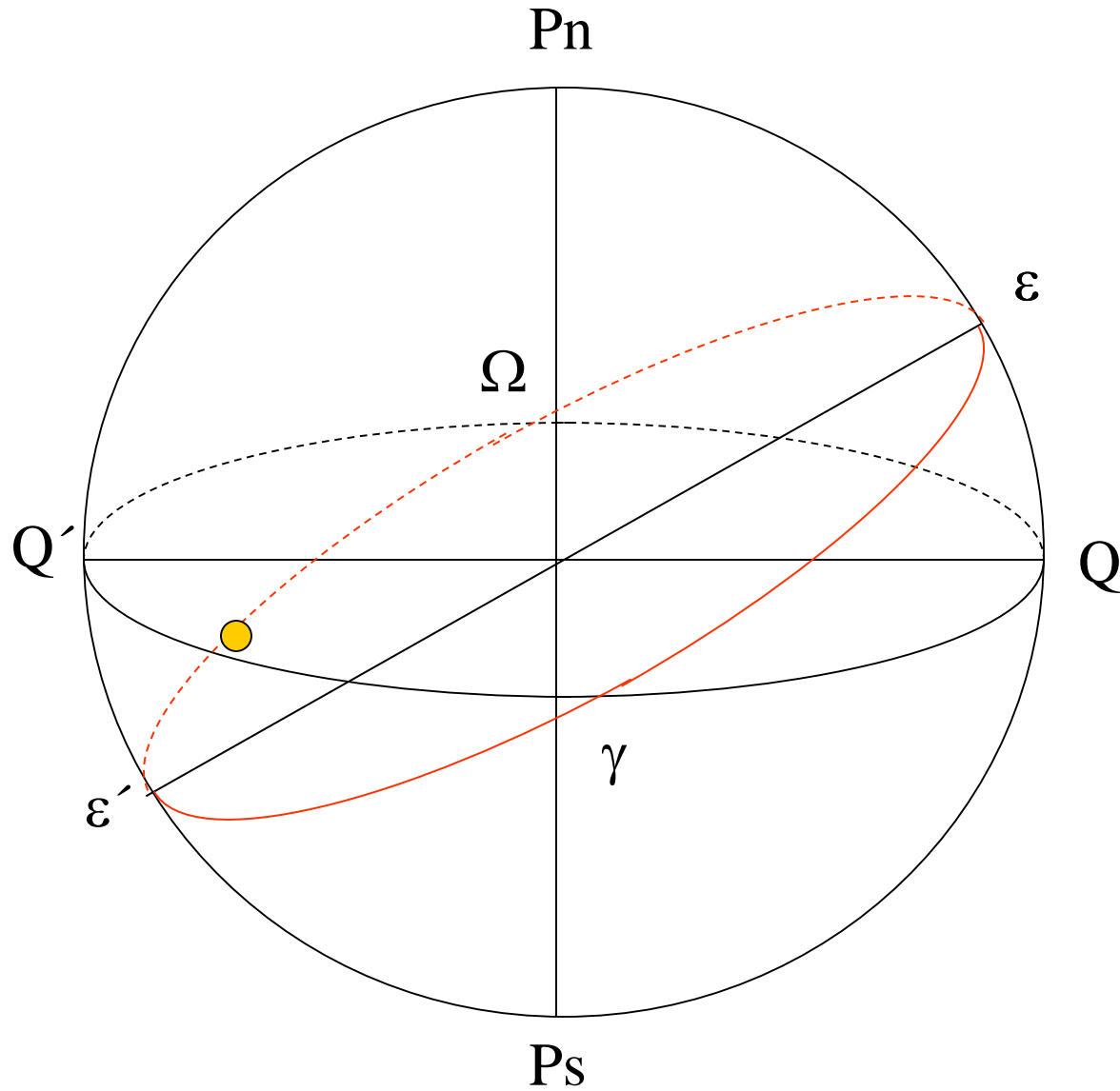






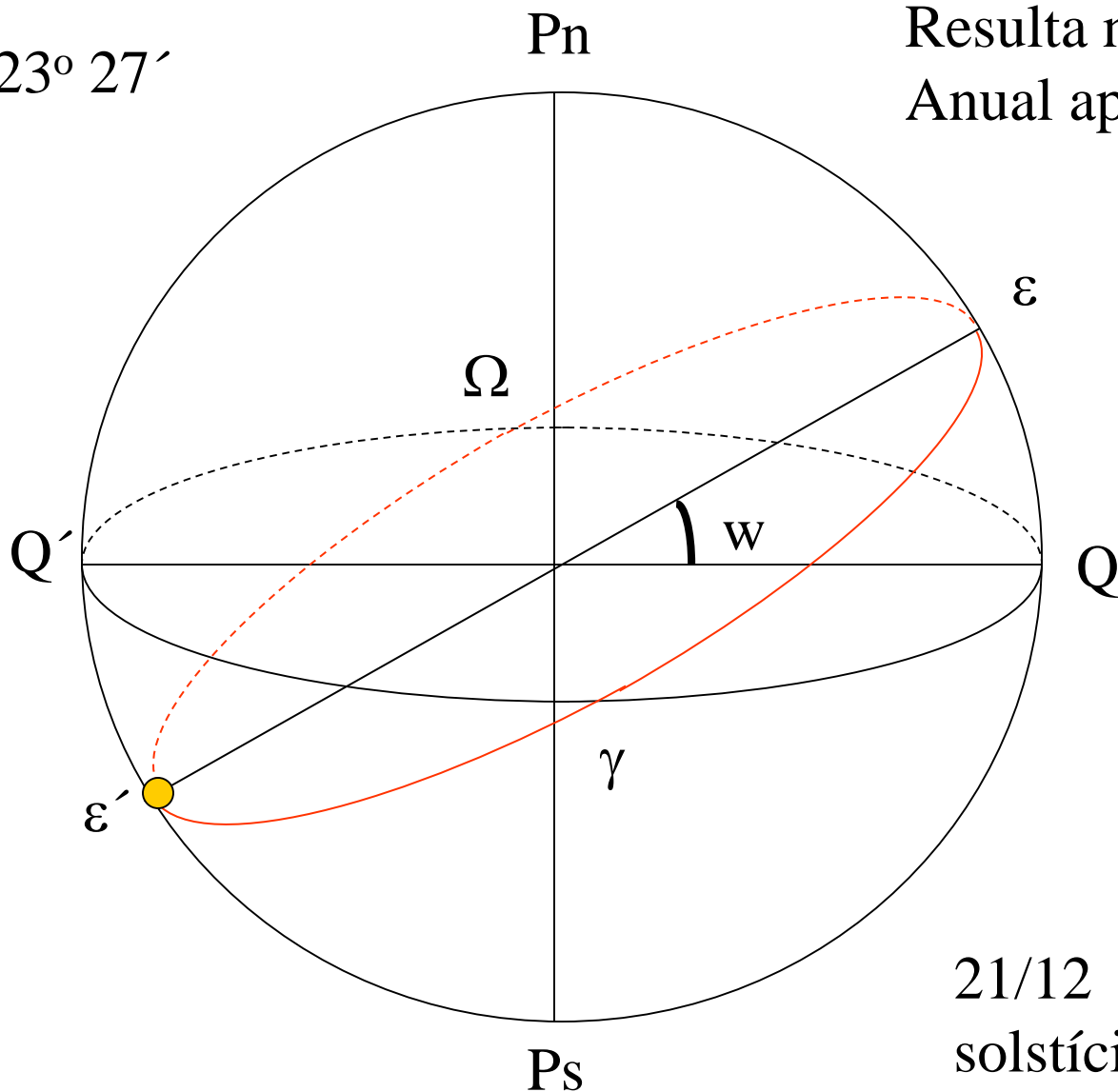






$$w = 23^\circ 27'$$

Resulta no movimento
Anual aparente do sol

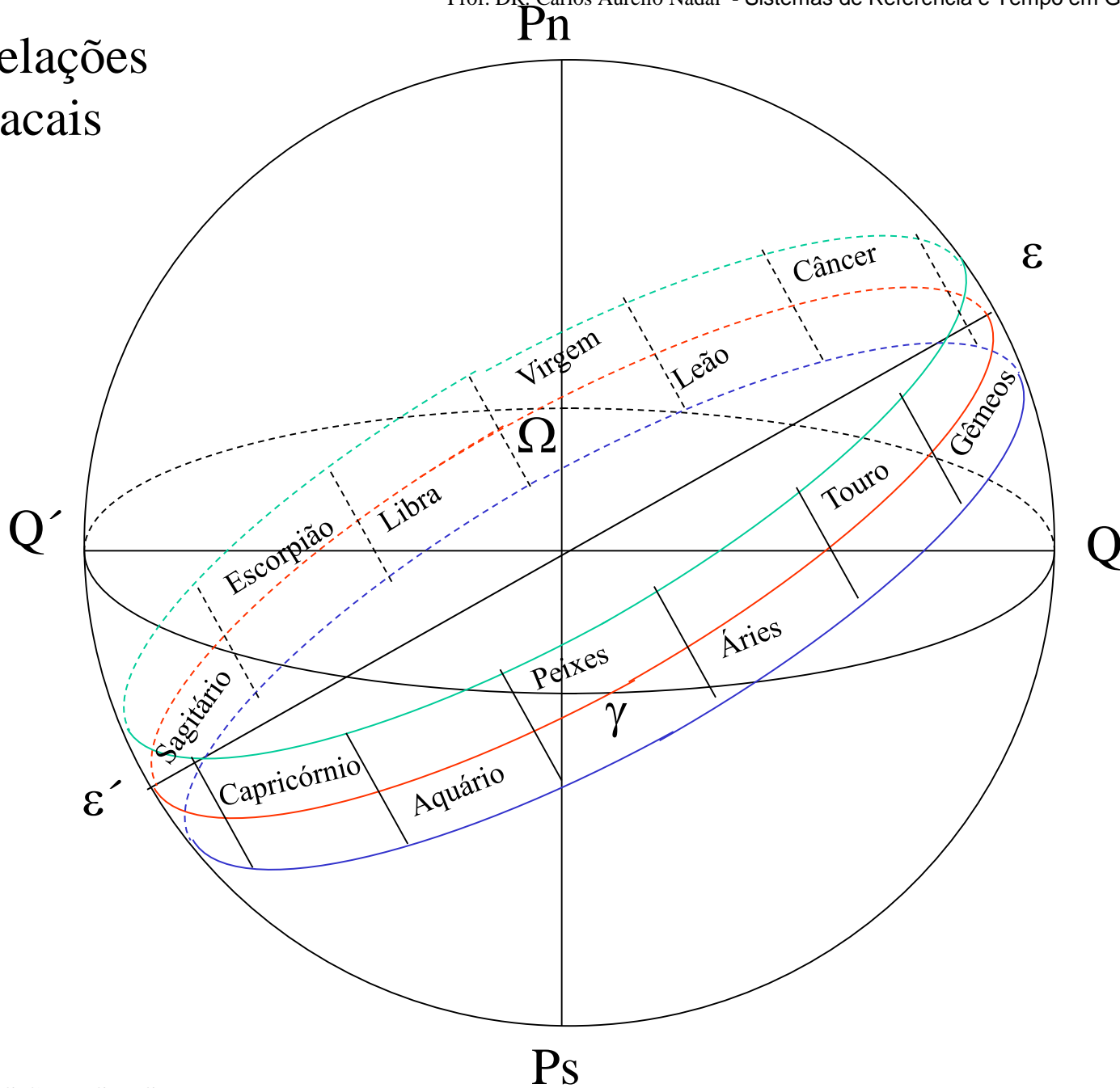


ϵ Elíptica

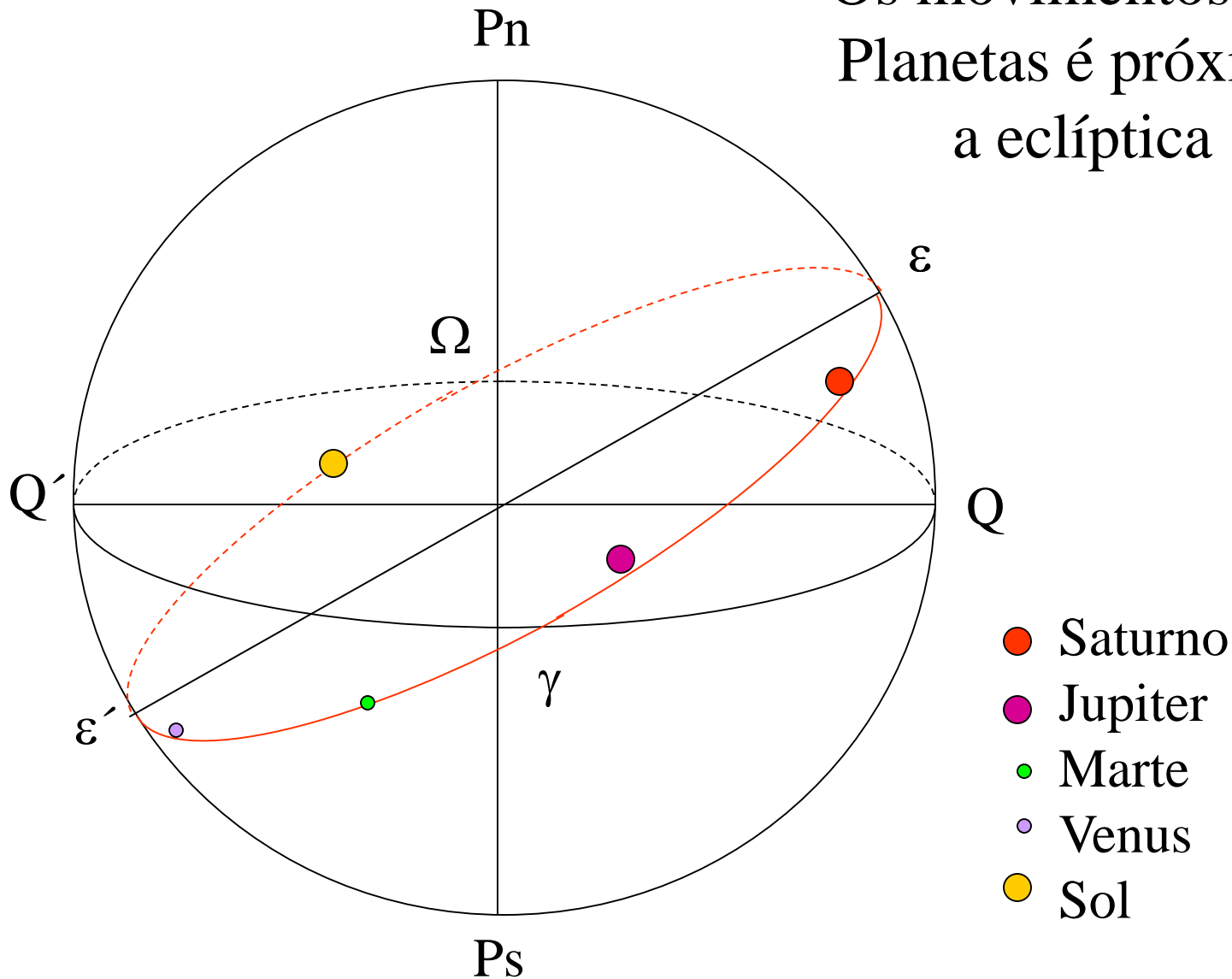
21/12
solstício de verão



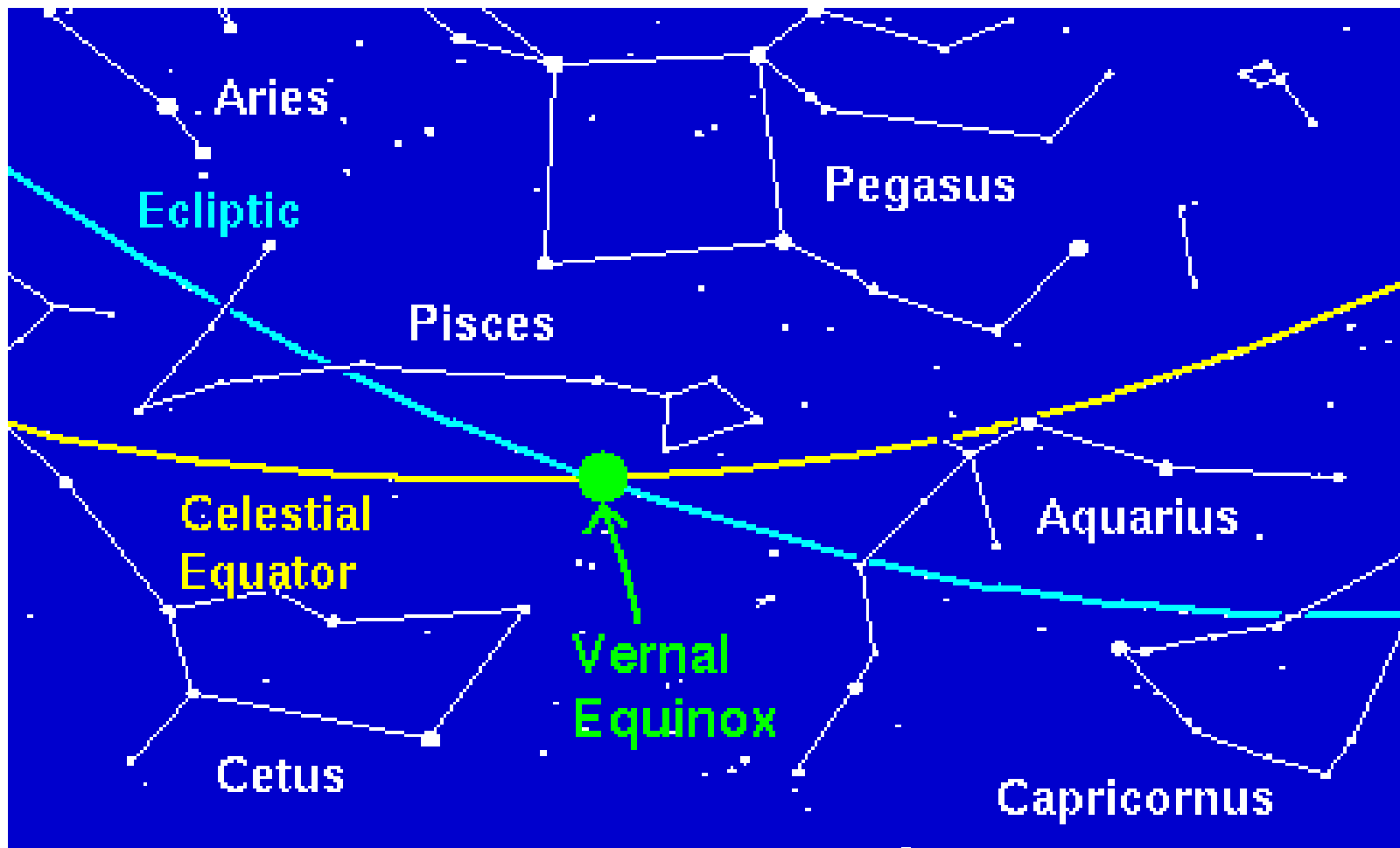
Constelações Zodiacais



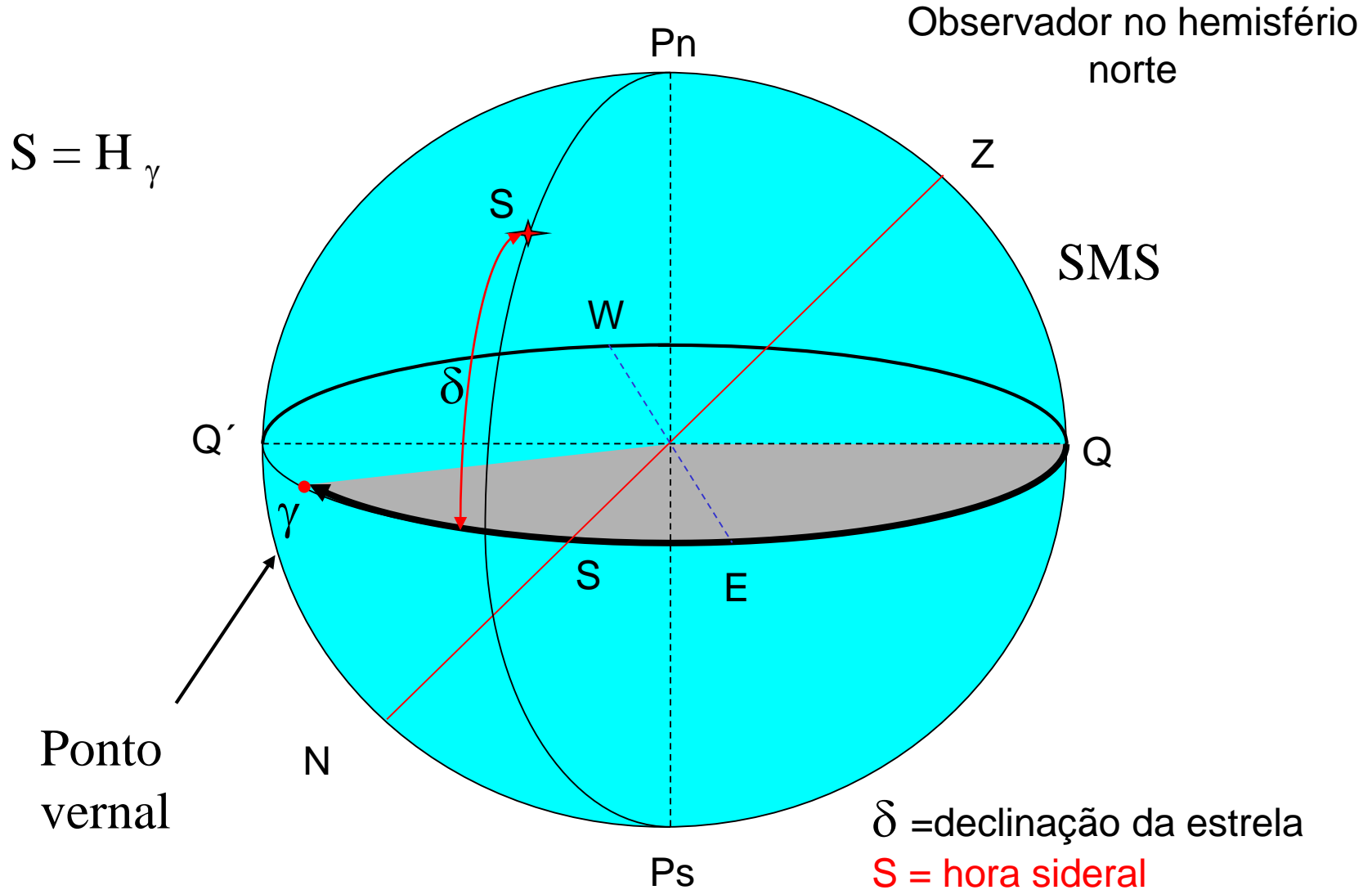
Os movimentos dos Planetas é próximo a eclíptica



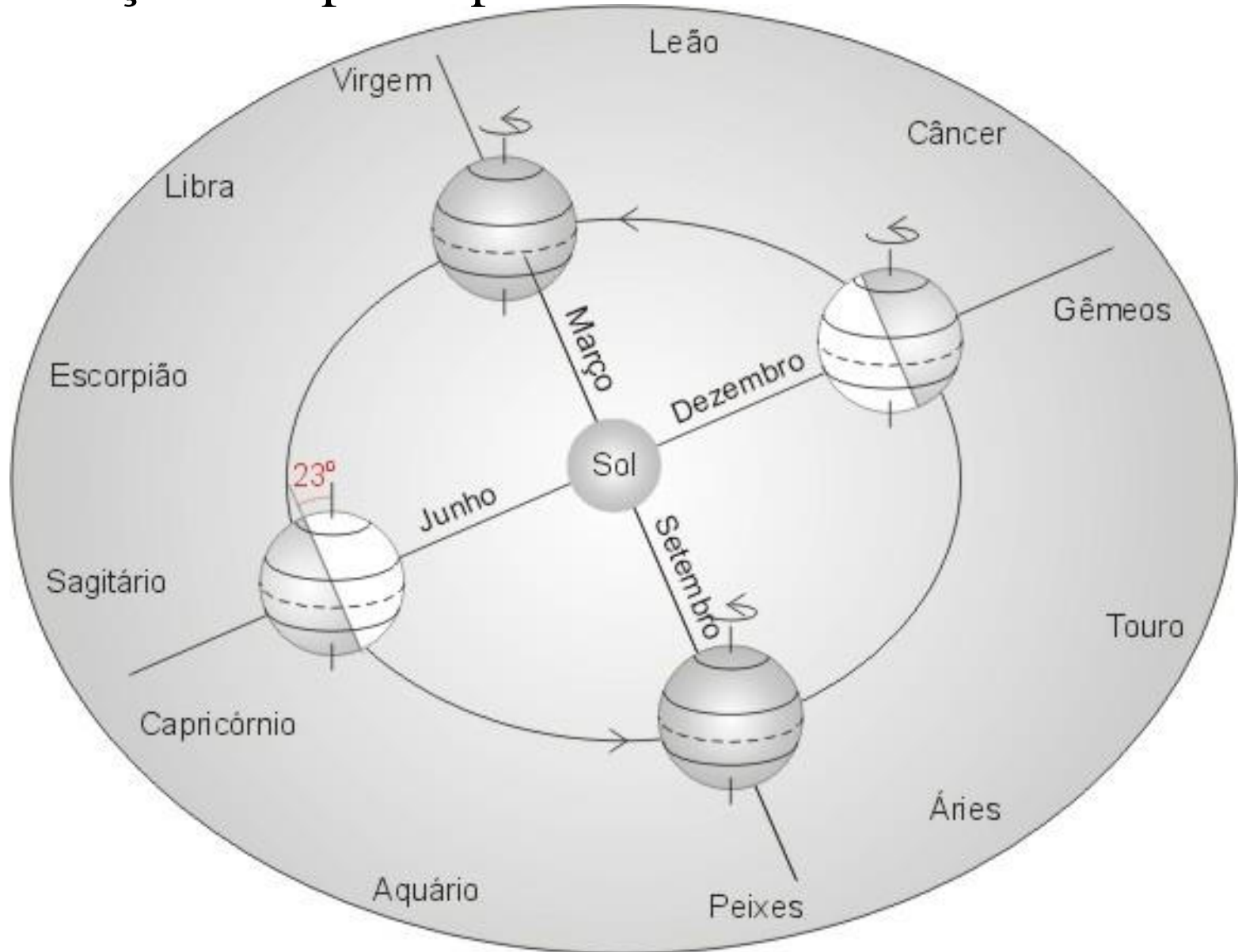
Localização do ponto vernal



Sistema de coordenadas horárias

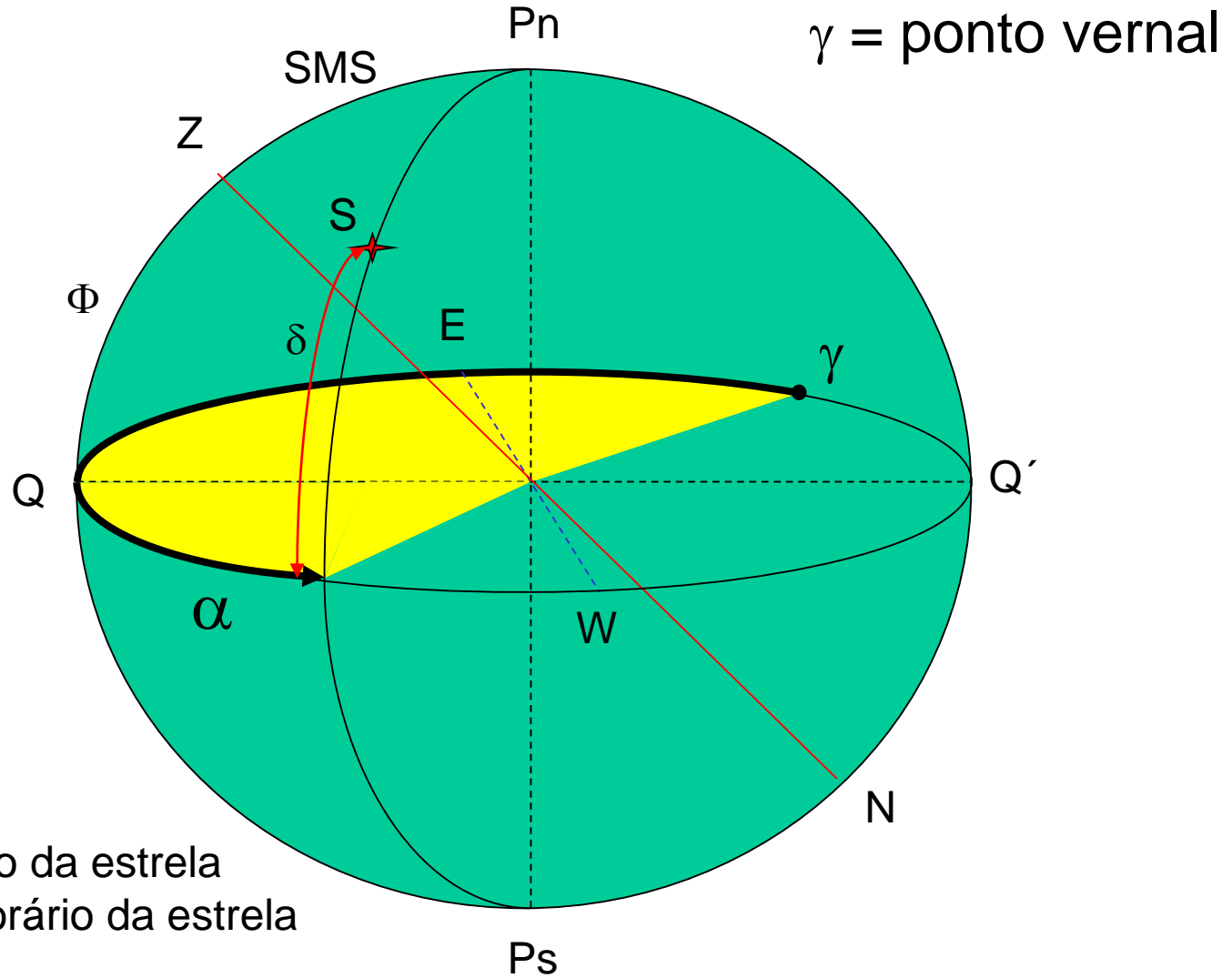


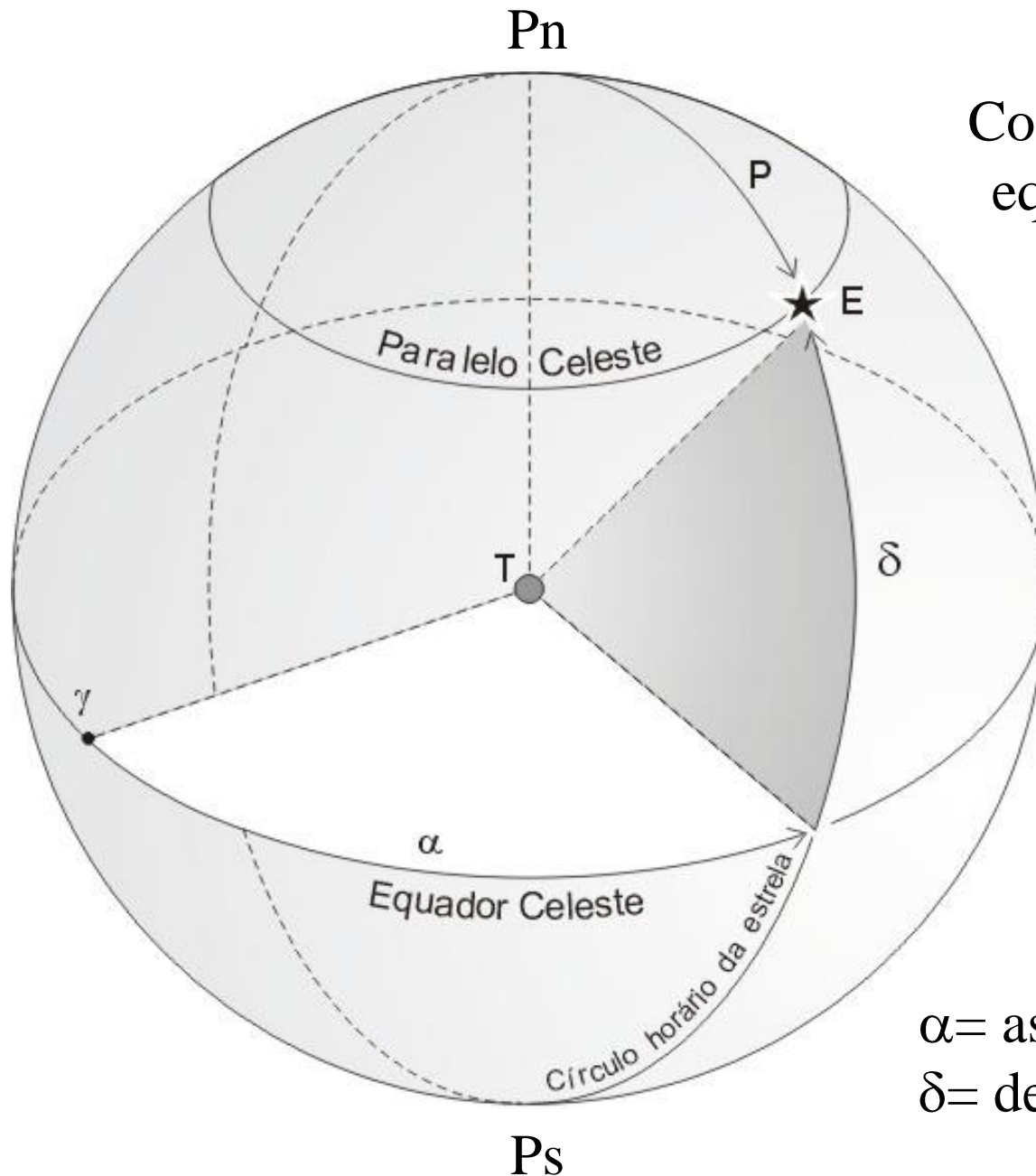
Posições ocupadas pela Terra na Esfera celeste





Sistema de coordenadas equatoriais





α = ascensão reta
 δ = declinação

CATÁLOGOS CELESTES

Estrela α Aurigae (Capella)

As coordenadas médias referem-se ao equinócio e época J2000,0.

Dados do catálogo fundamental FK6

Número da estrela: 193

Magnitude: 0,1

Tipo espectral: G0

$\alpha_0 = 5^{\text{h}} 16^{\text{min}} 41,353^{\text{s}}$

$\delta_0 = 45^{\circ} 59' 52,90''$

$\mu\alpha = 0,728 \text{ s/sec}$

$\mu\delta = -42,47''/\text{sec}$

$\pi = 0,072''$

$v = 30,1 \text{ km/s}$

Coordenadas Eclípticas

