



Centro de Divulgação Científica e Cultural



Centro de Divulgação da Astronomia  
Observatório Dietrich Schiel

Minicurso básico

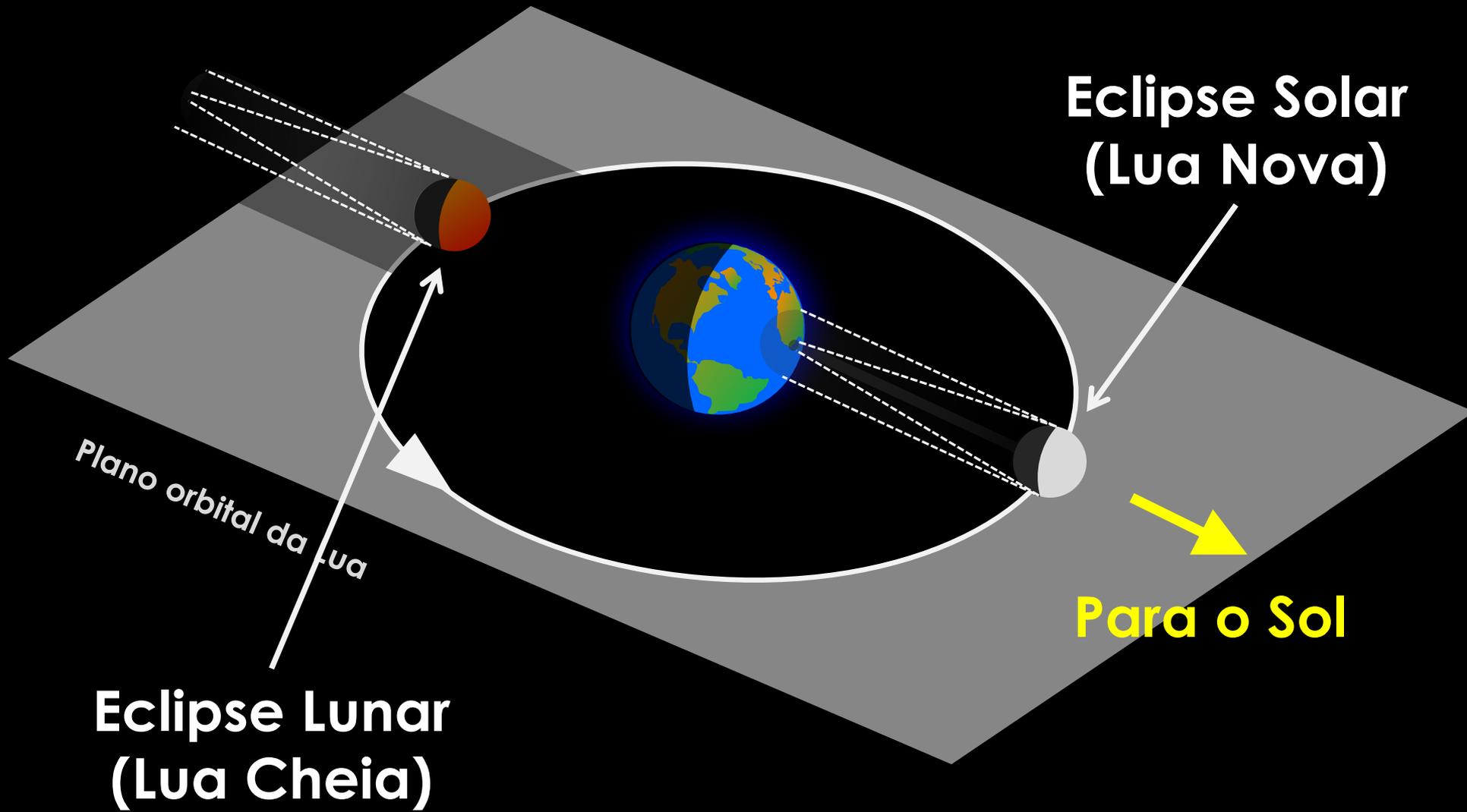


Introdução à  
Astronomia

# Eclipses

**André Luiz da Silva**  
Observatório Dietrich Schiel  
/CDCC/USP

Figura fora de escala



Sobre sombras

**Umbra**

**Figura fora de escala**

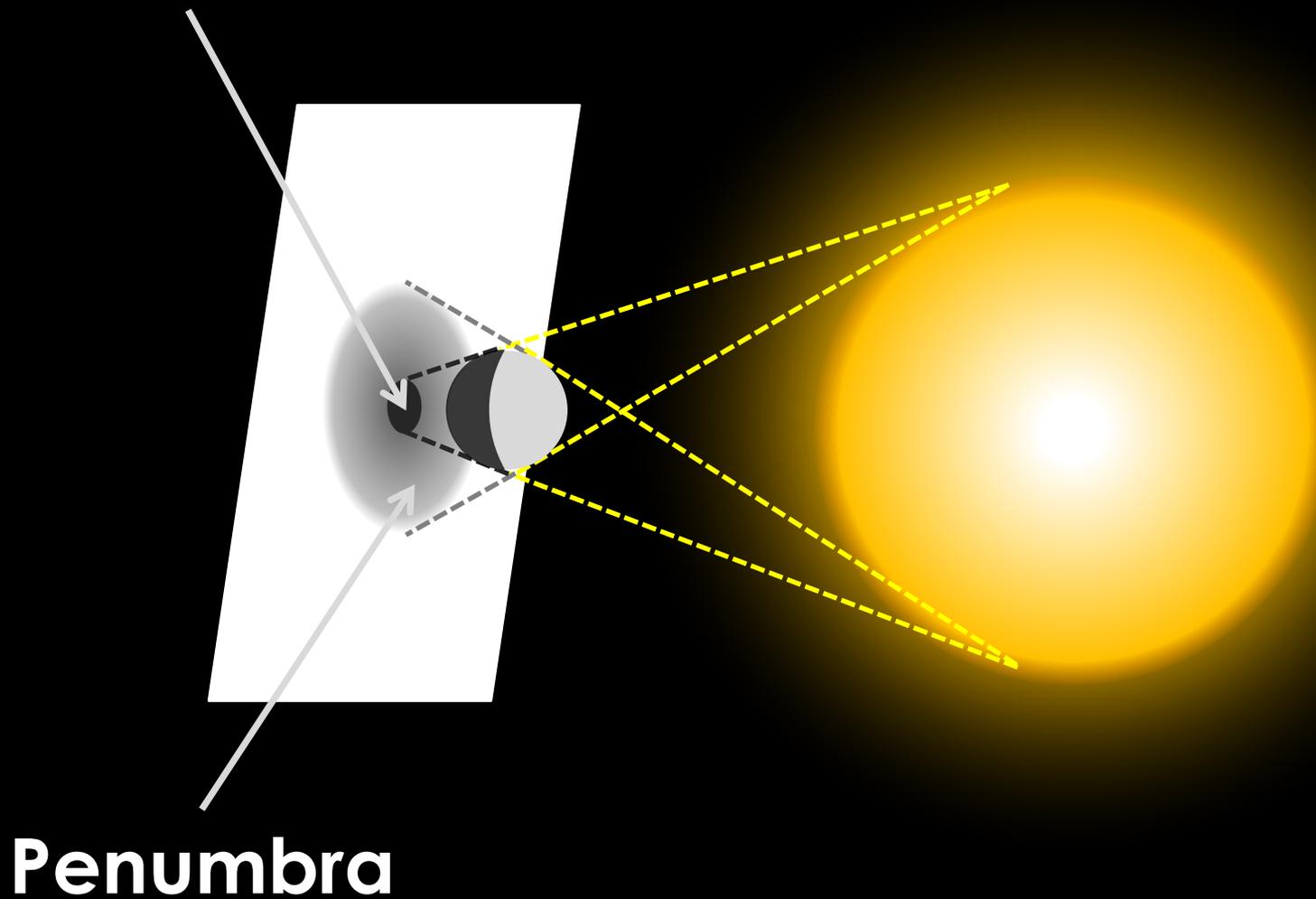
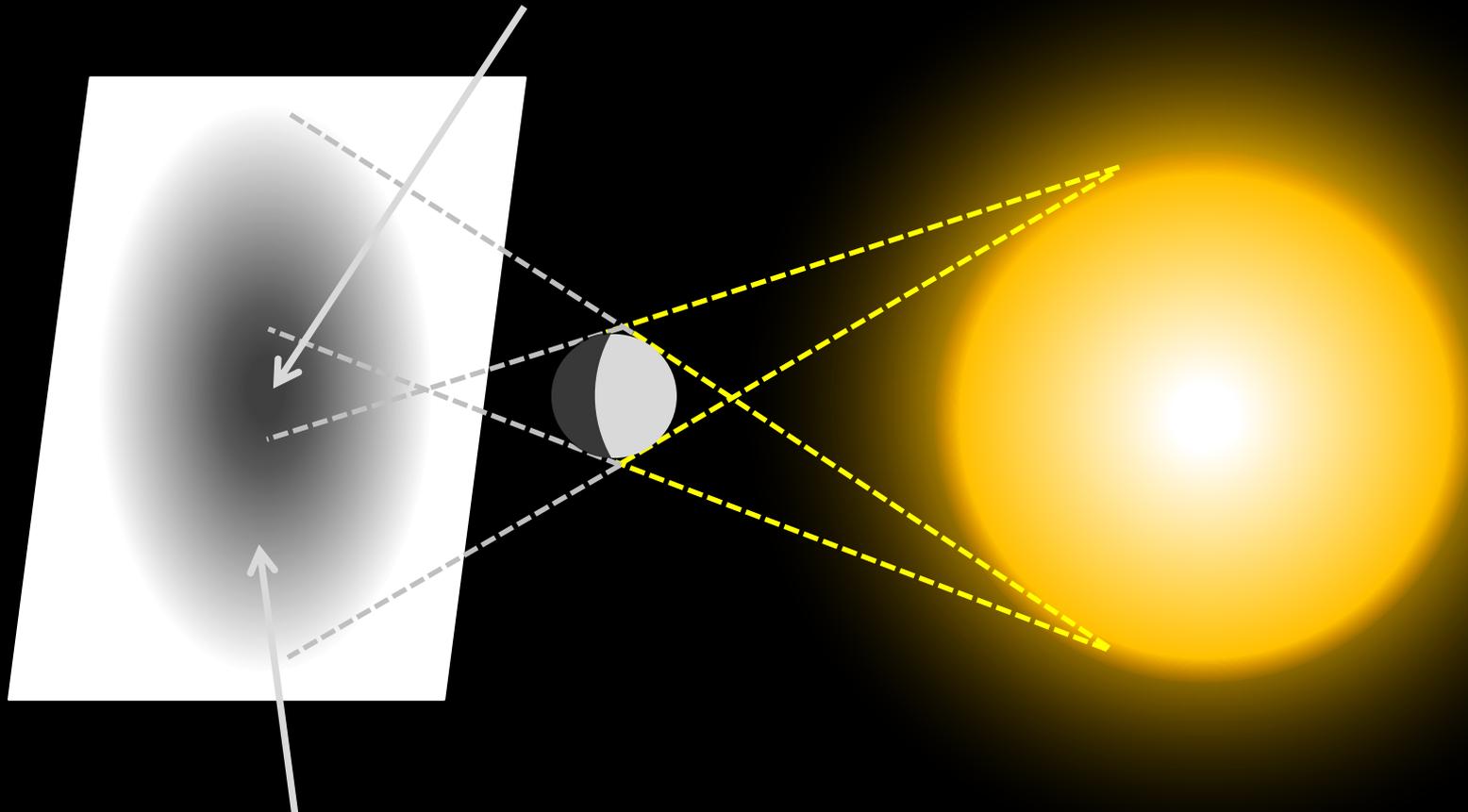


Figura fora de escala

**Antiumbra**



**Penumbra**

# Eclipses Solares

**tipos:**

❖ **Total**

❖ **Anular**

❖ **Parcial**

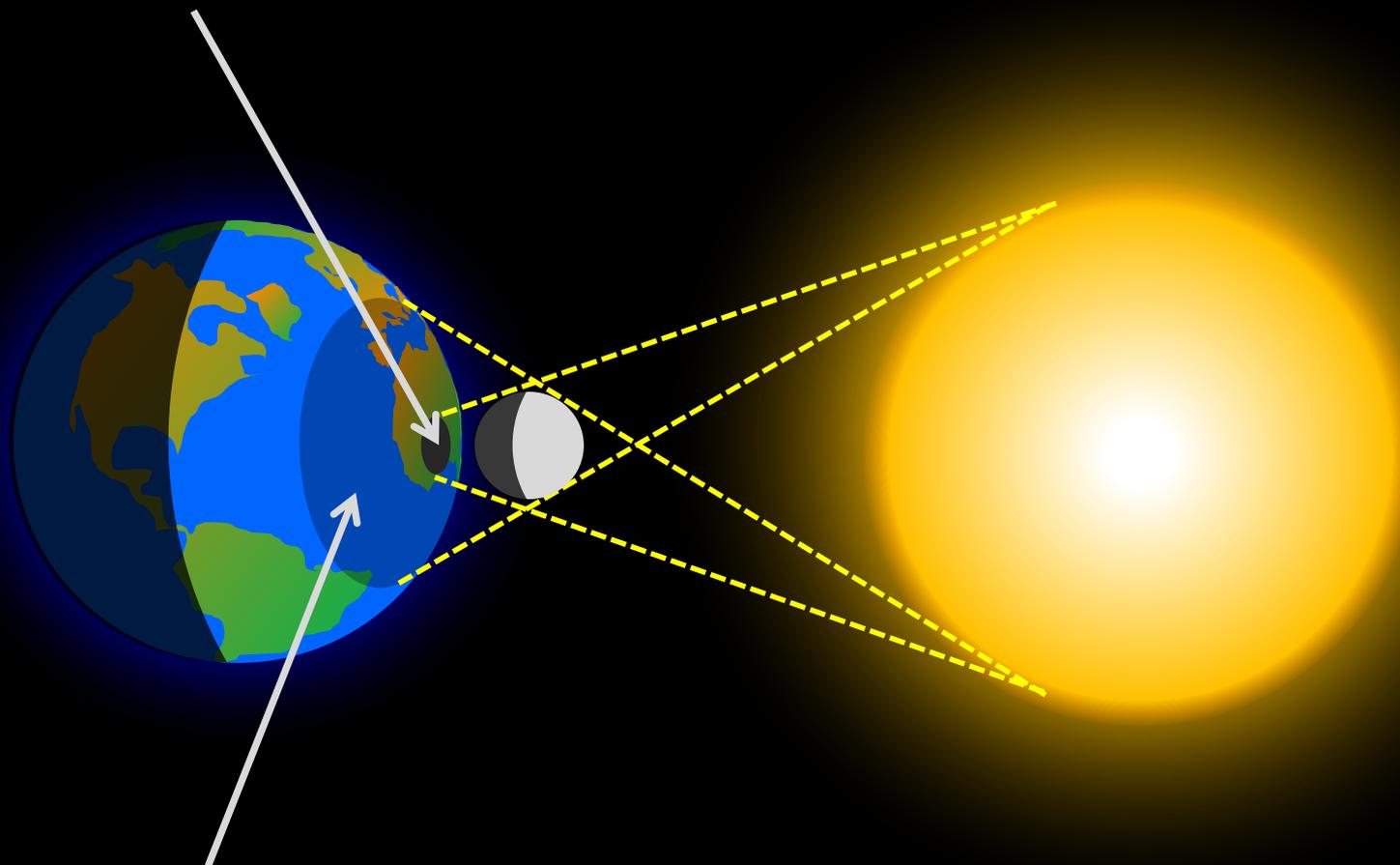
# eclipse solar total



Crédito da imagem: NASA/Aubrey Gemignani

**Umbra**

Figura fora de escala



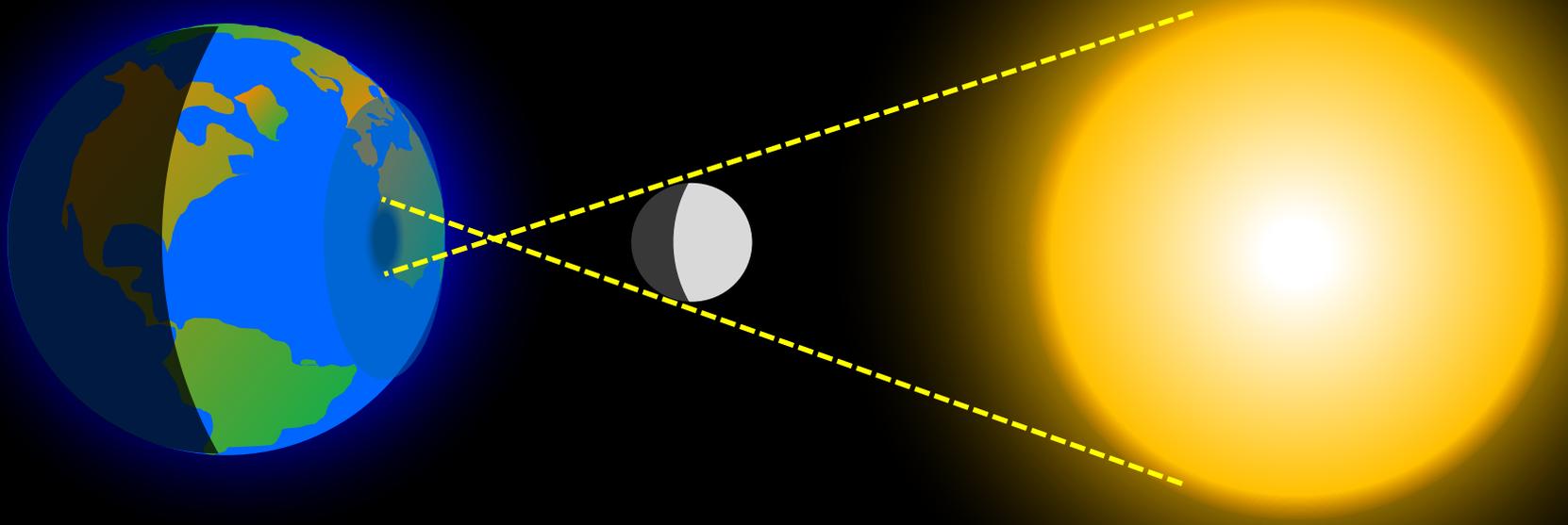
**Penumbra**

# eclipse solar anular



Crédito da imagem: *Wikimedia Commons user Kevin Baird, under c.c.-by-s.a.-3.0.*

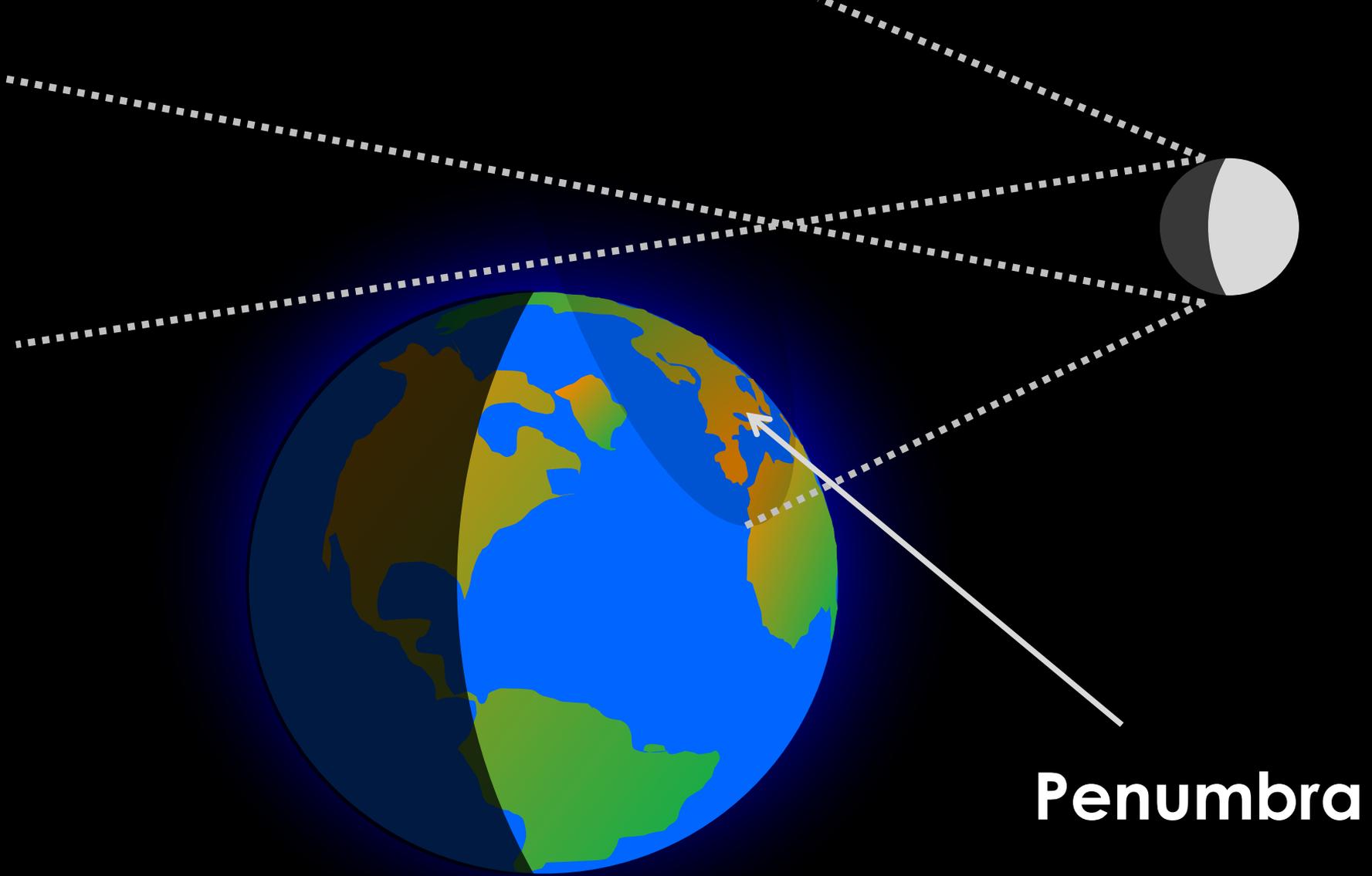
Figura fora de escala



Crédito da imagem: André Luiz da Silva/CDA/CDCC

# eclipse solar parcial





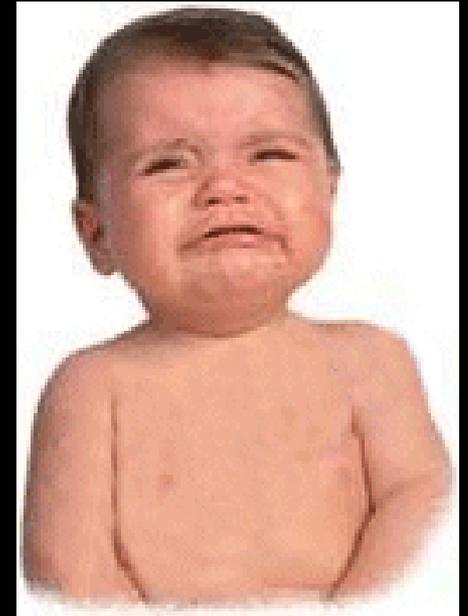
**Penumbra**

**Figura fora de escala**

**Crédito da imagem: André Luiz da Silva/CDA/CDCC/USP**

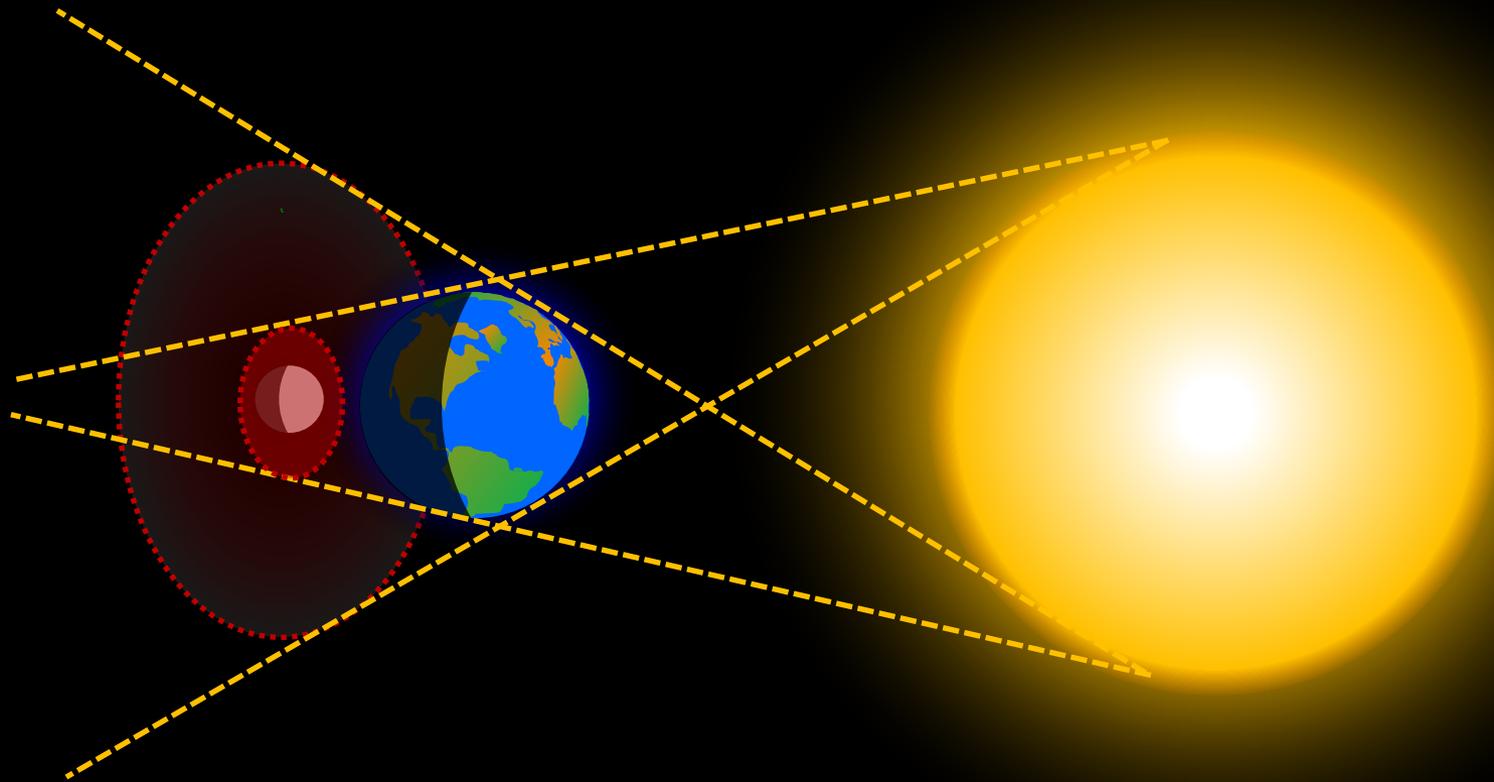
# Próximos eclipses solares totais visíveis do Brasil:

- ❖ 12 de agosto de 2045
- ❖ 11 de maio de 2059



# Eclipses Lunares

Figura fora de escala



Crédito da imagem: André Luiz da Silva/CDA/CDCC

# Tipos de eclipses lunares

- ❖ **Total**
- ❖ **Parcial umbral**
- ❖ **Penumbral**

# eclipse lunar total



Crédito da imagem: NASA

Figura fora de escala

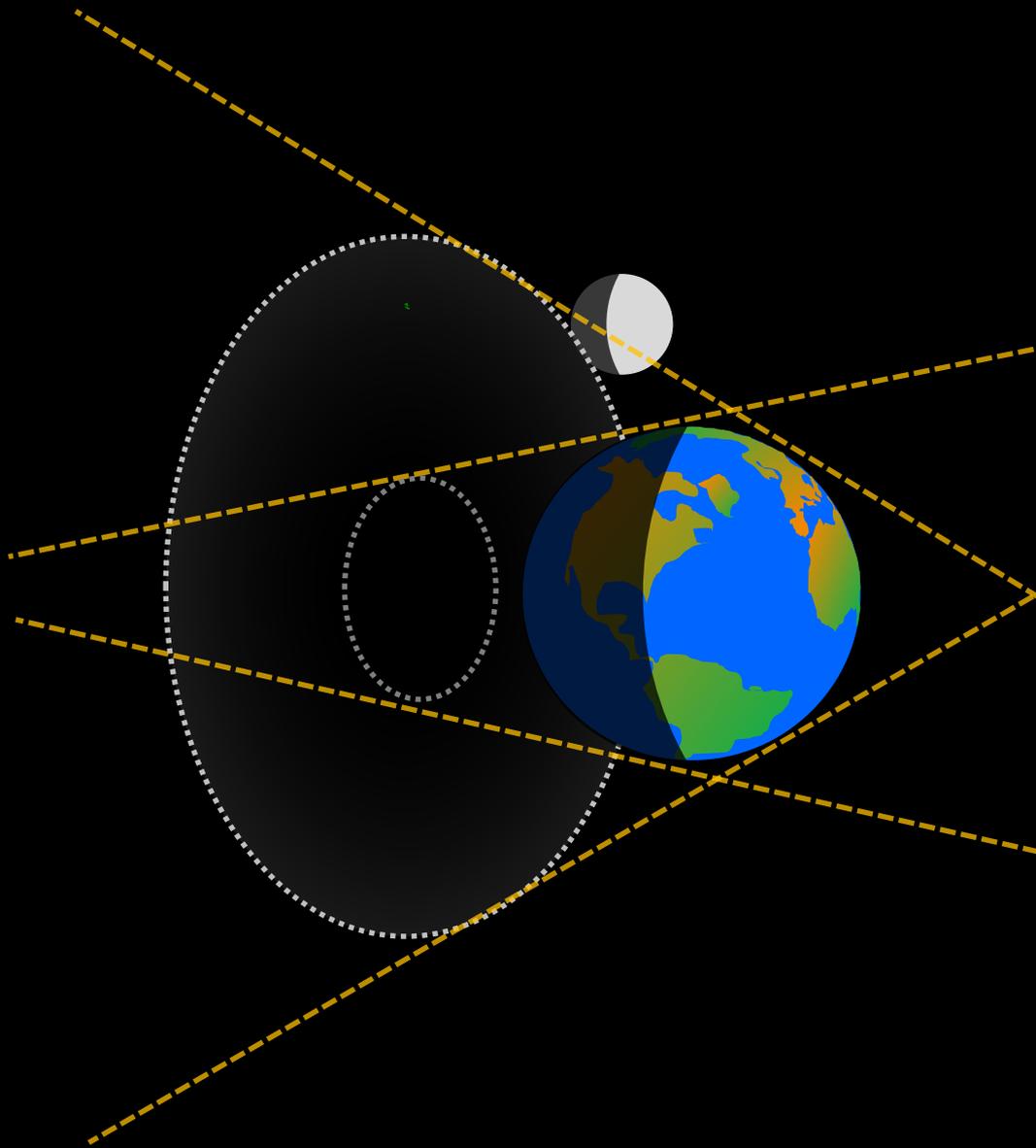
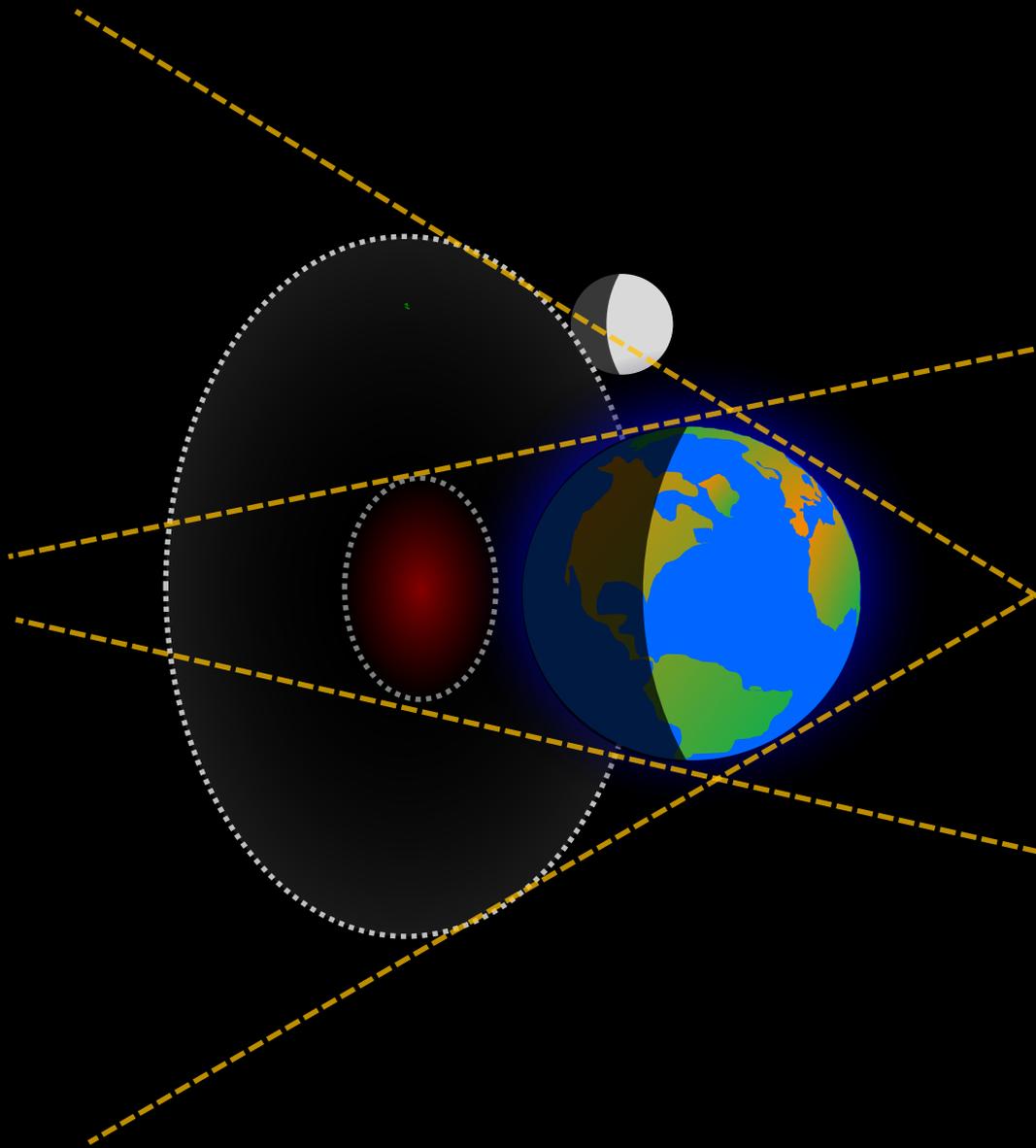


Figura fora de escala





# Eclipse Lunar visto da Lua

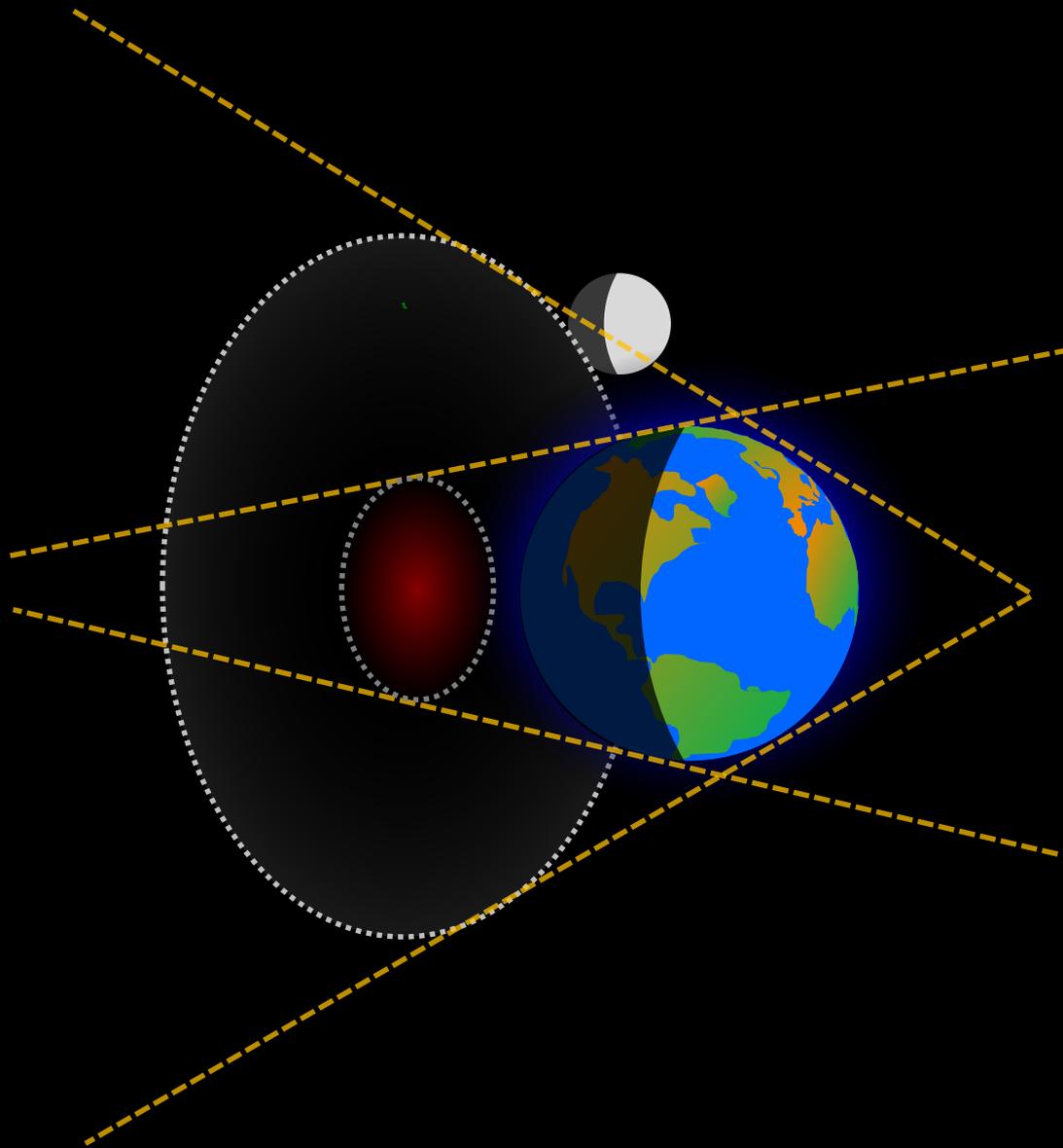


# Eclipse lunar parcial umbral



Crédito da imagem: George Tarsoudis

Figura fora de escala



# Eclipse lunar penumbral

Before Eclipse

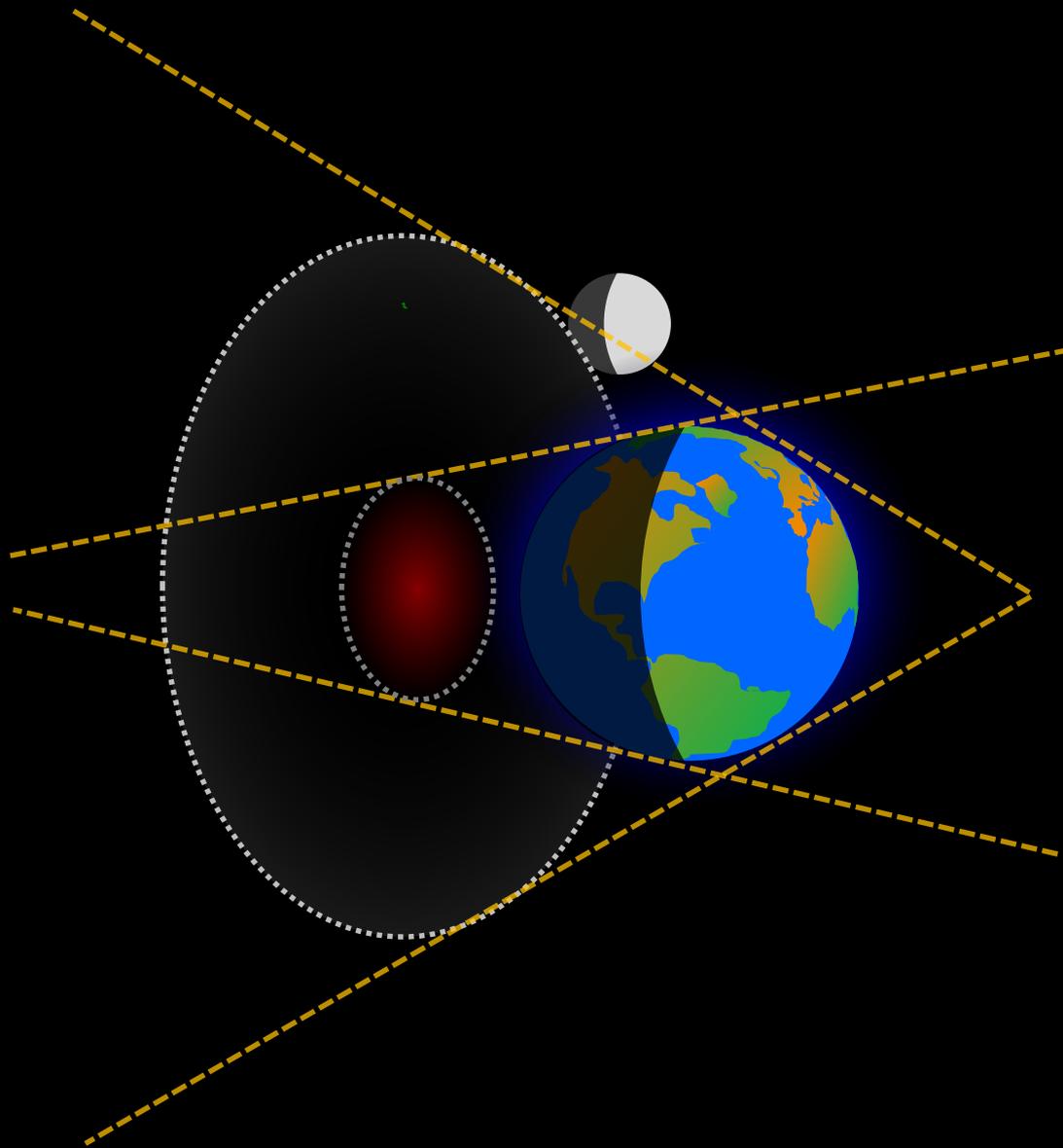


Mid-Eclipse



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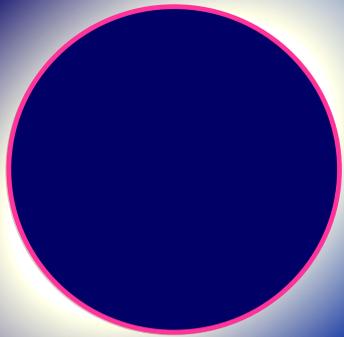
Figura fora de escala



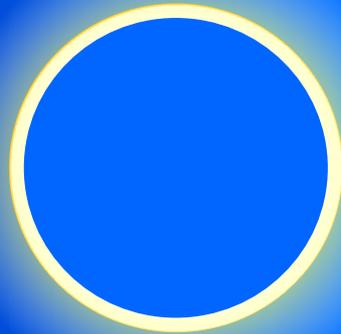
Crédito da imagem: André Luiz da Silva/CDA/CDCC/USP

# Resumindo: eclipses solares

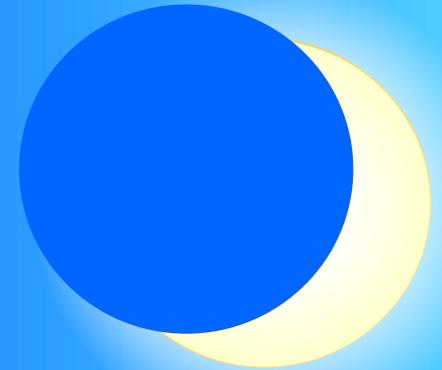
**Total**



**Anular**



**Parcial**



# Resumindo... Eclipses lunares

**Total**



**Parcial  
umbral**



**Penumbral**



# Próximo eclipse lunar total

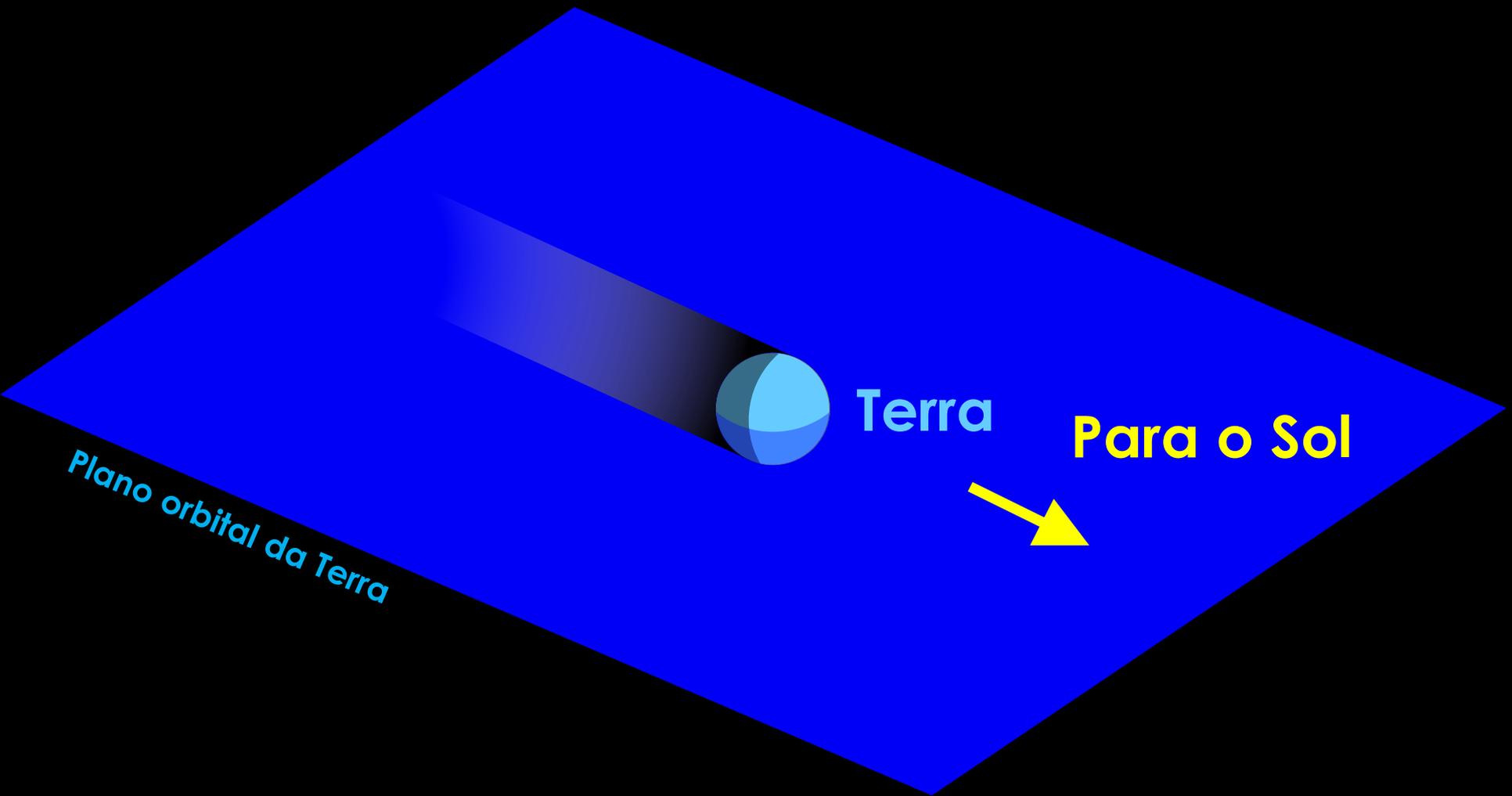
❖ 21 de janeiro de 2019





# Apêndice

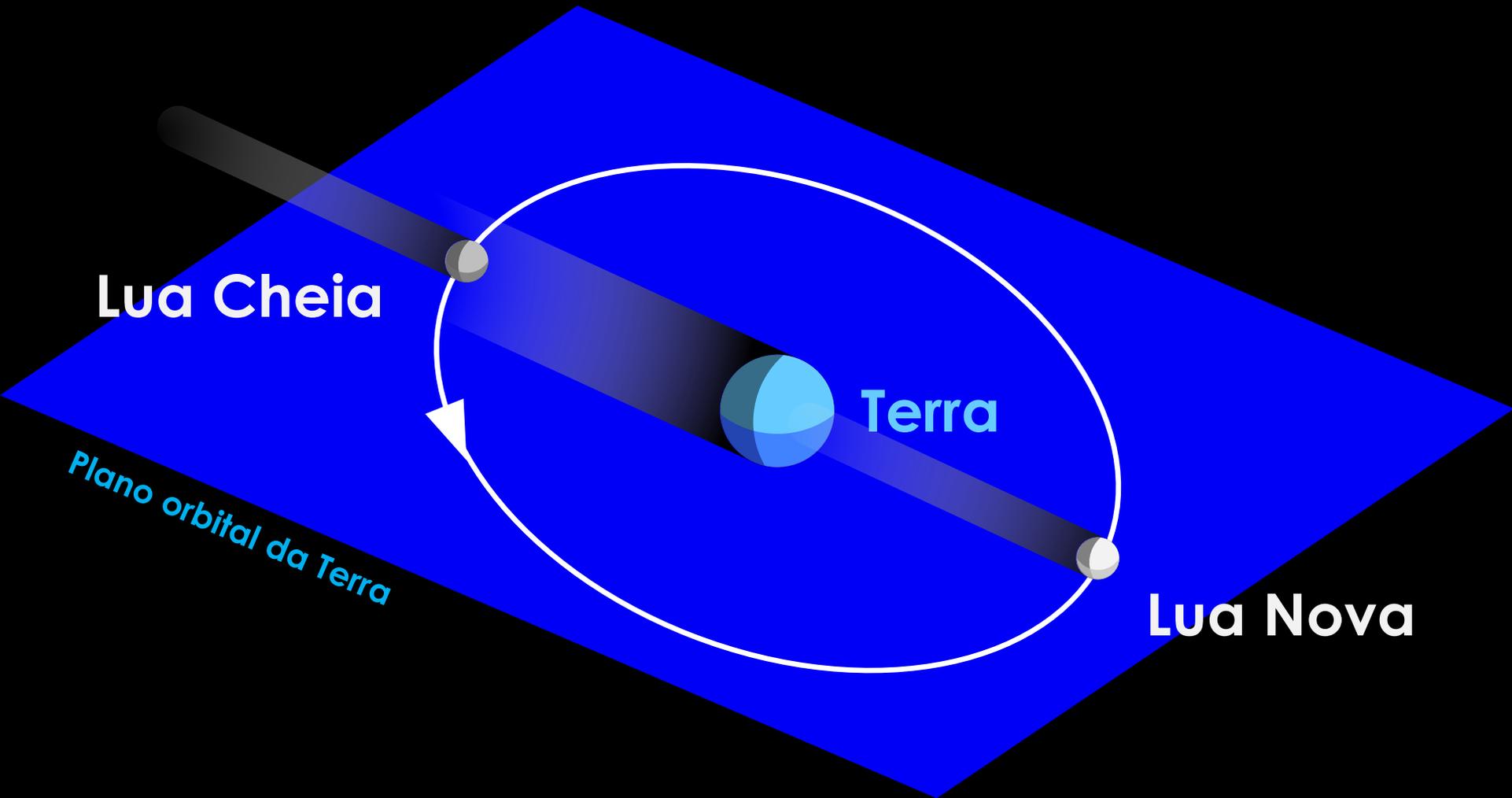
O mecanismo dos eclipses



Plano orbital da Terra

Terra

Para o Sol



**Se os planos orbitais coincidissem...**

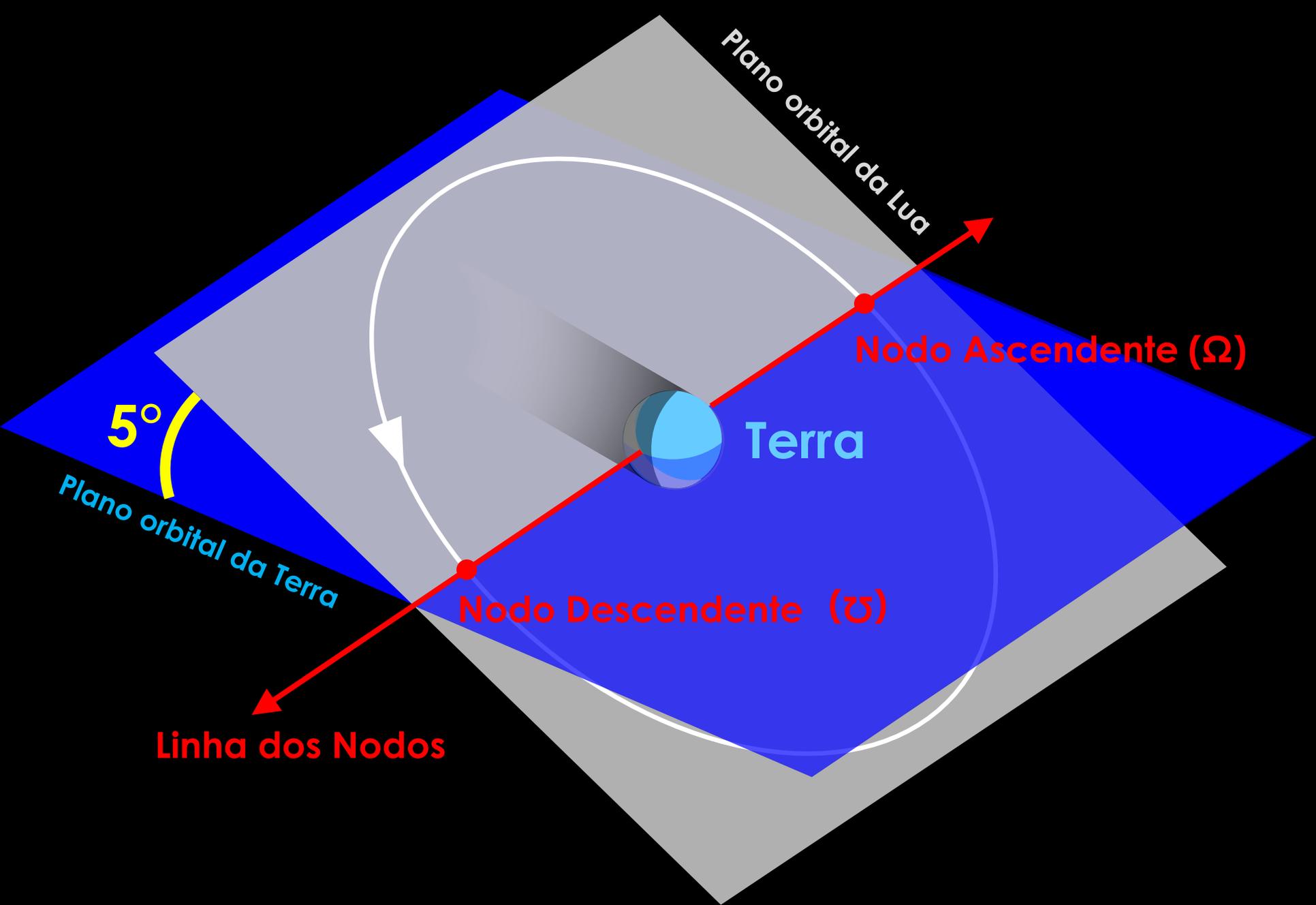


Figura fora de escala

Crédito da imagem: André Luiz da Silva/CDA/CDCC/USP

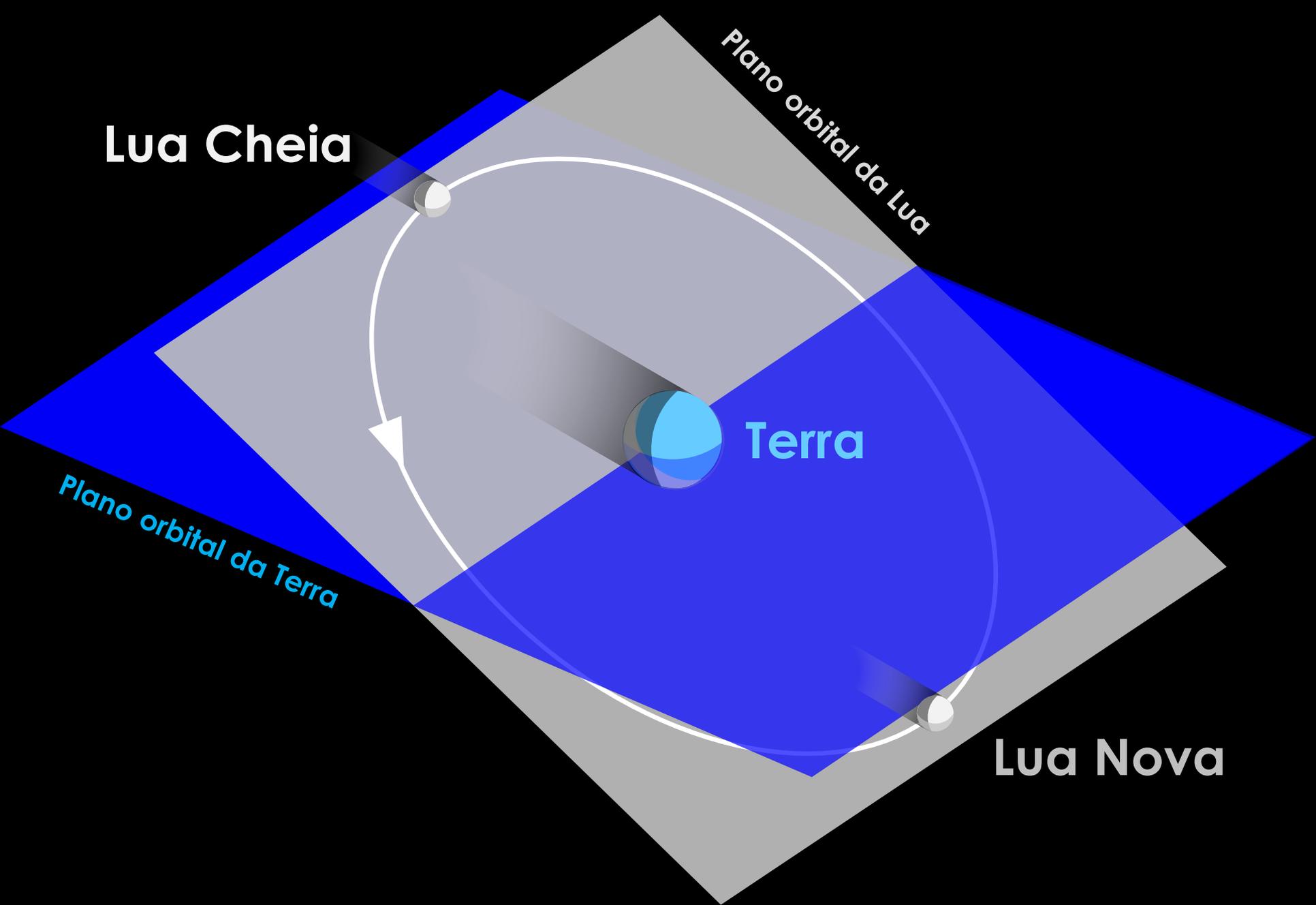


Figura fora de escala

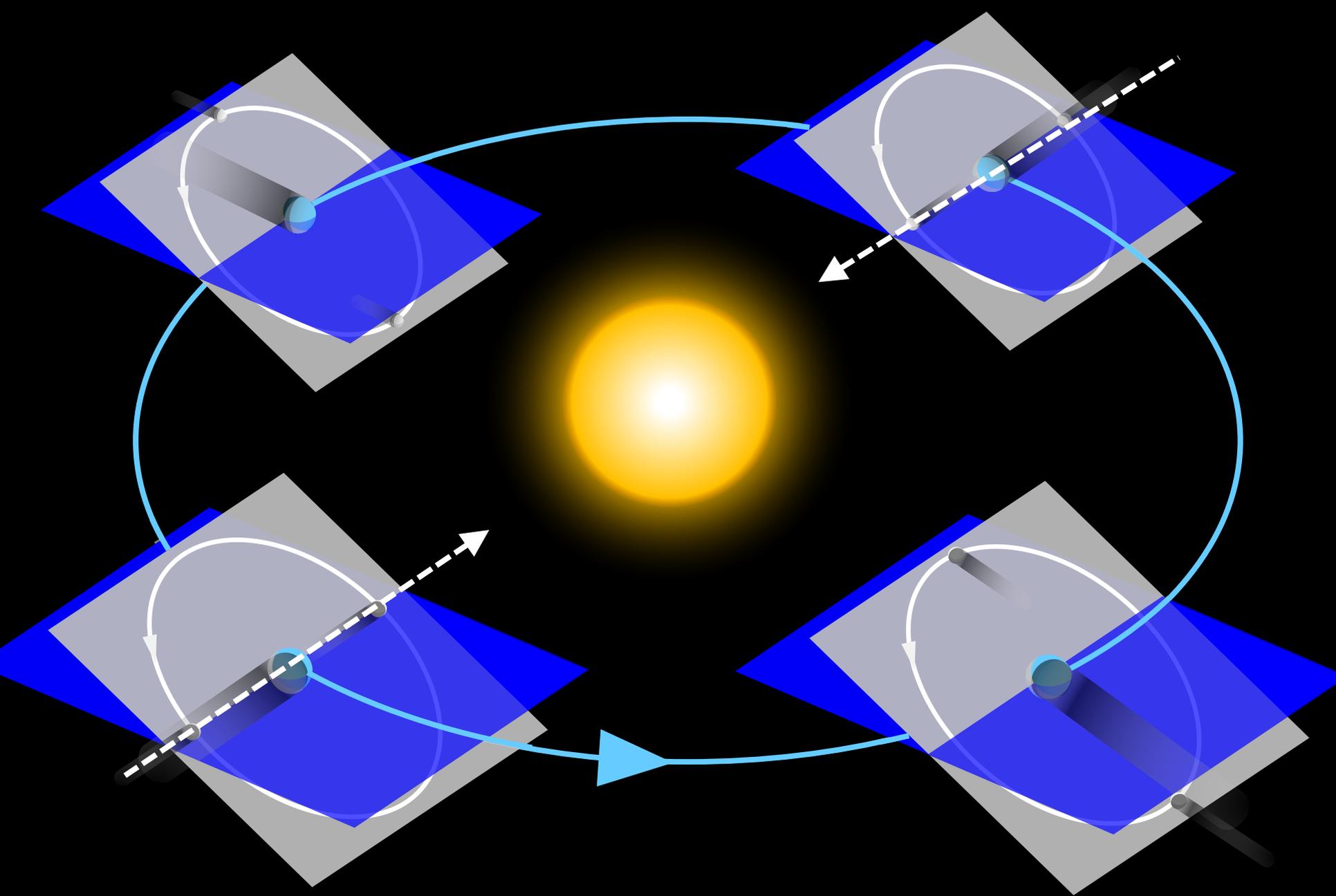


Figura fora de escala

Crédito da imagem: André Luiz da Silva/CDA/CDCC/USP

Linha dos nodos  
“quase não gira”

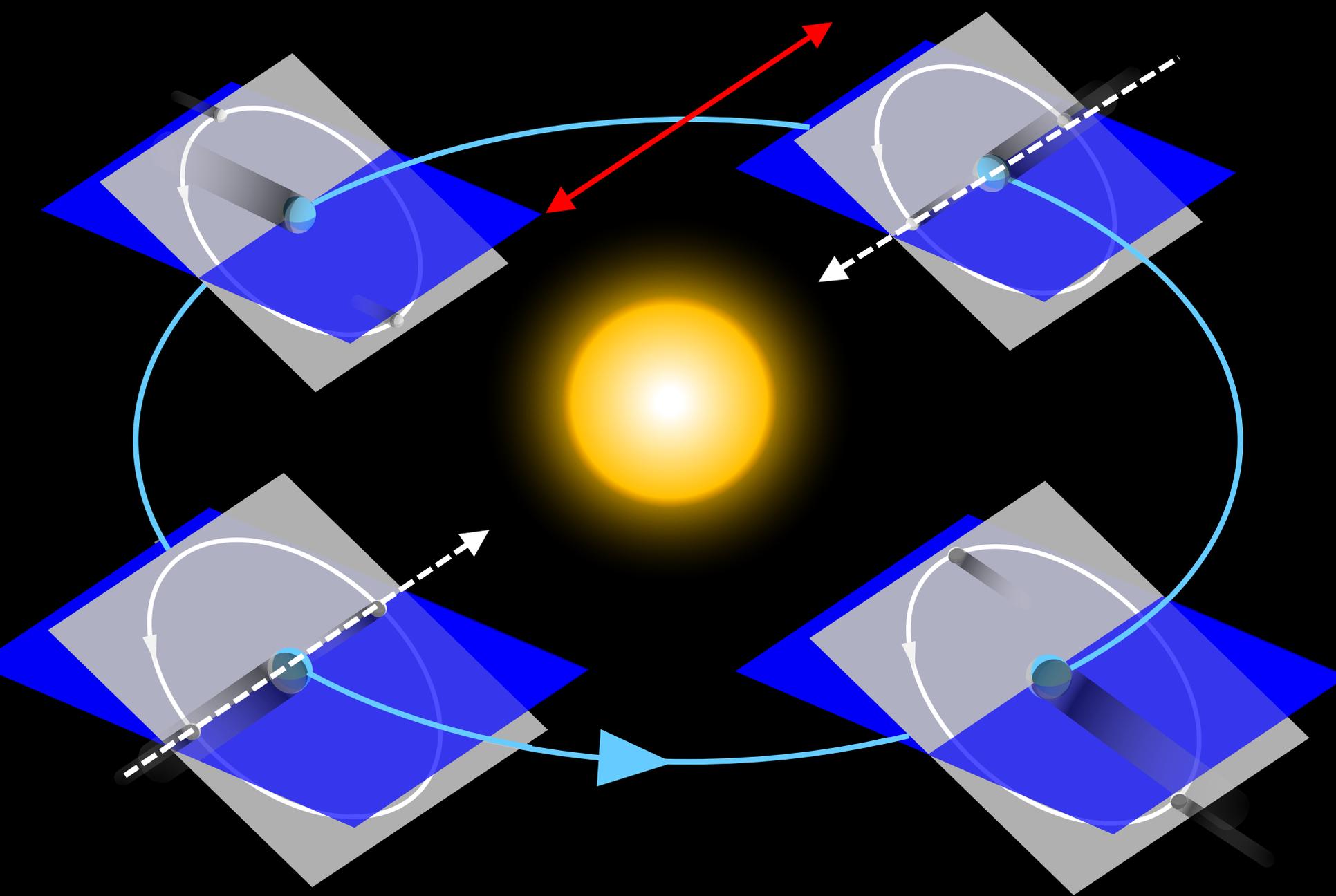


Figura fora de escala

Para ser mais preciso...

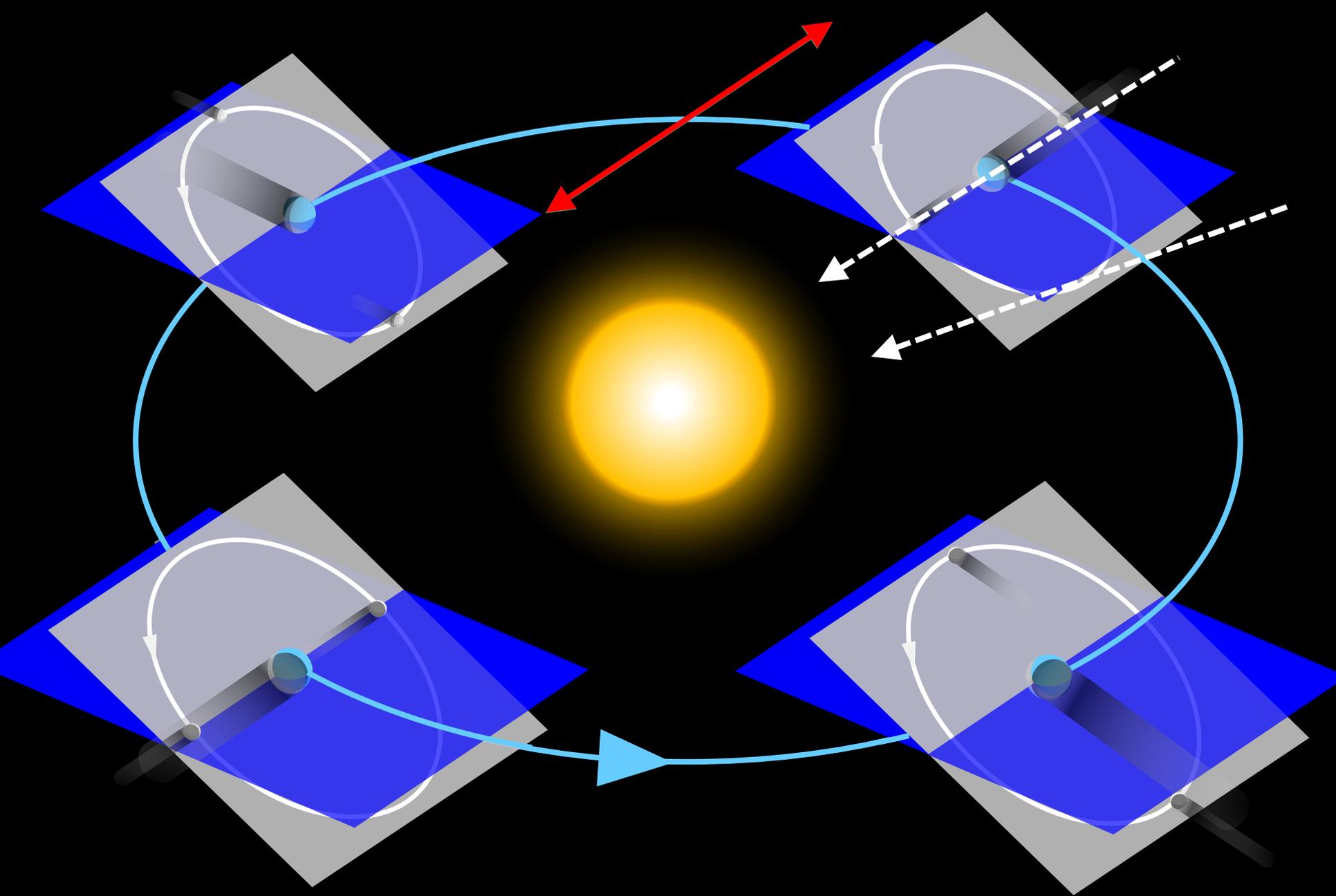
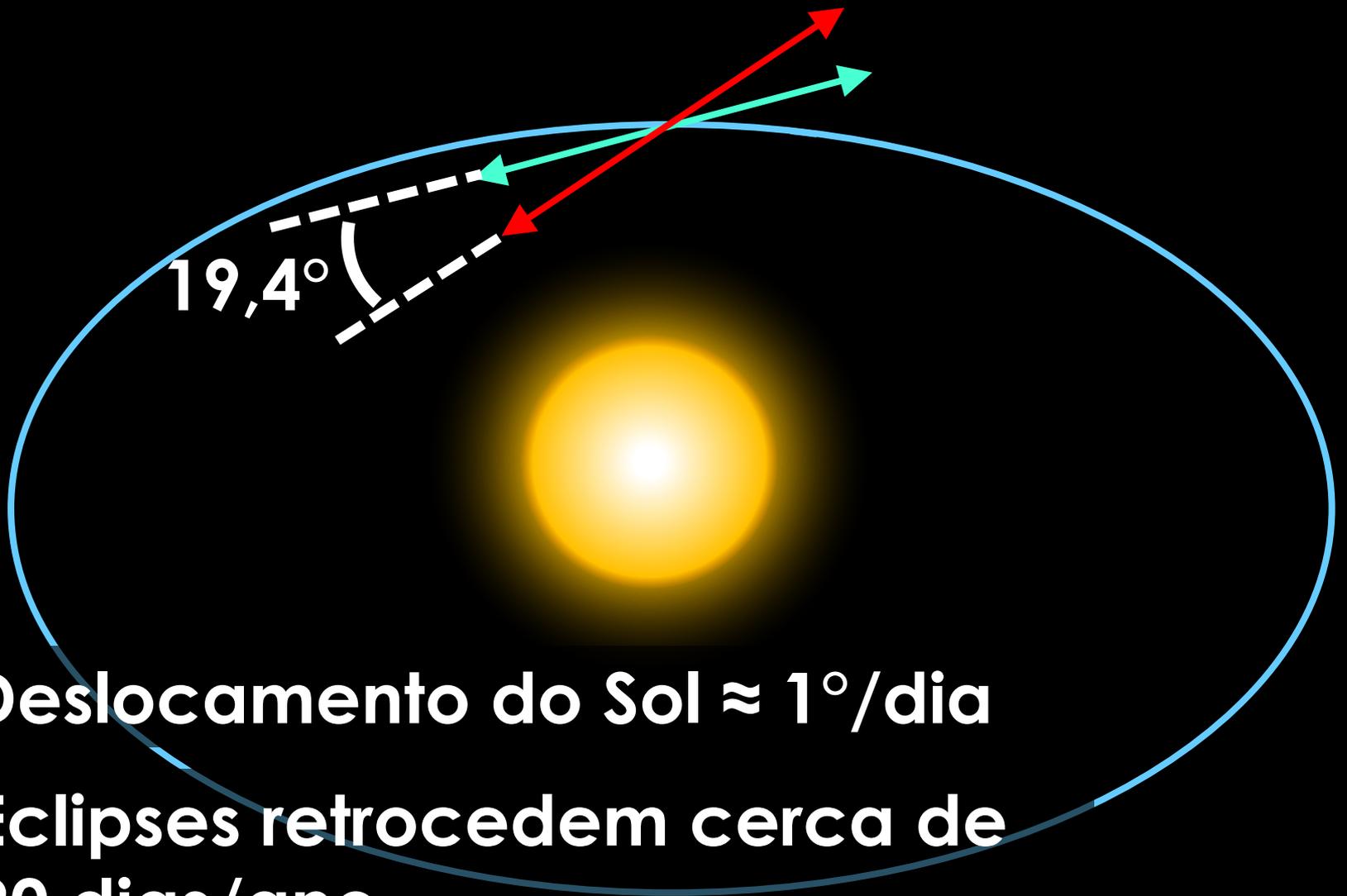


Figura fora de escala



- ❖ Deslocamento do Sol  $\approx 1^\circ/\text{dia}$
- ❖ Eclipses retrocedem cerca de 20 dias/ano

Figura fora de escala