

PHYS 110: Liberal Arts Physics

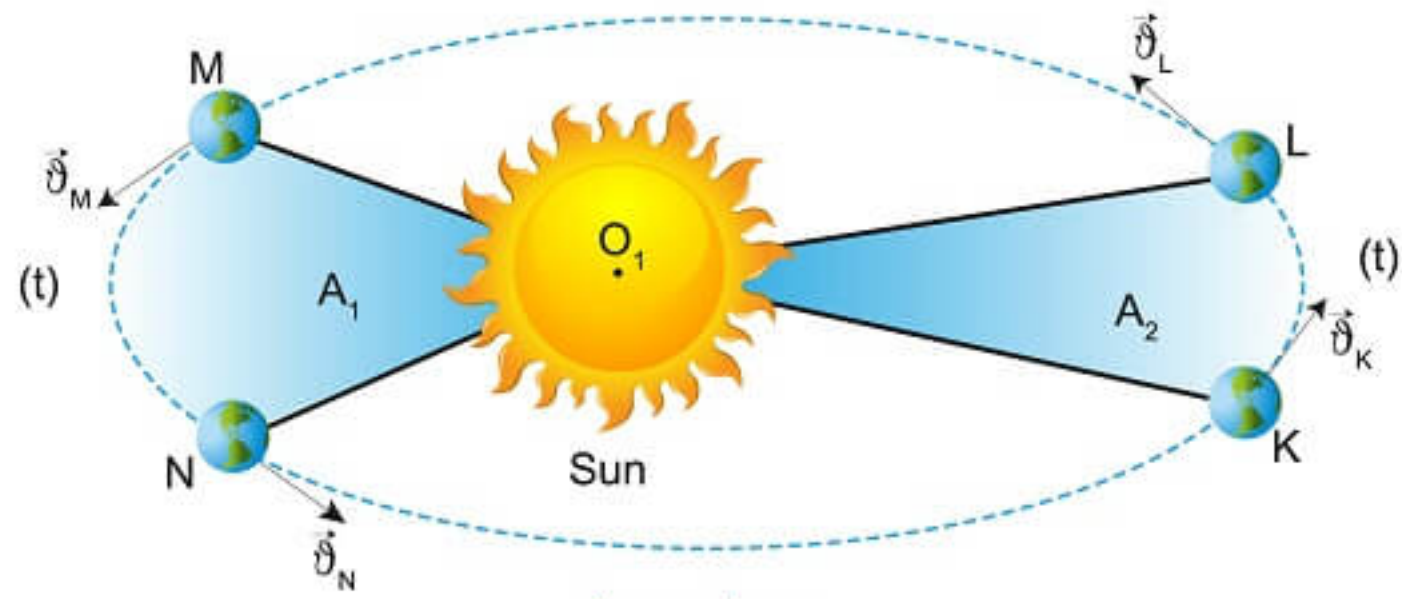
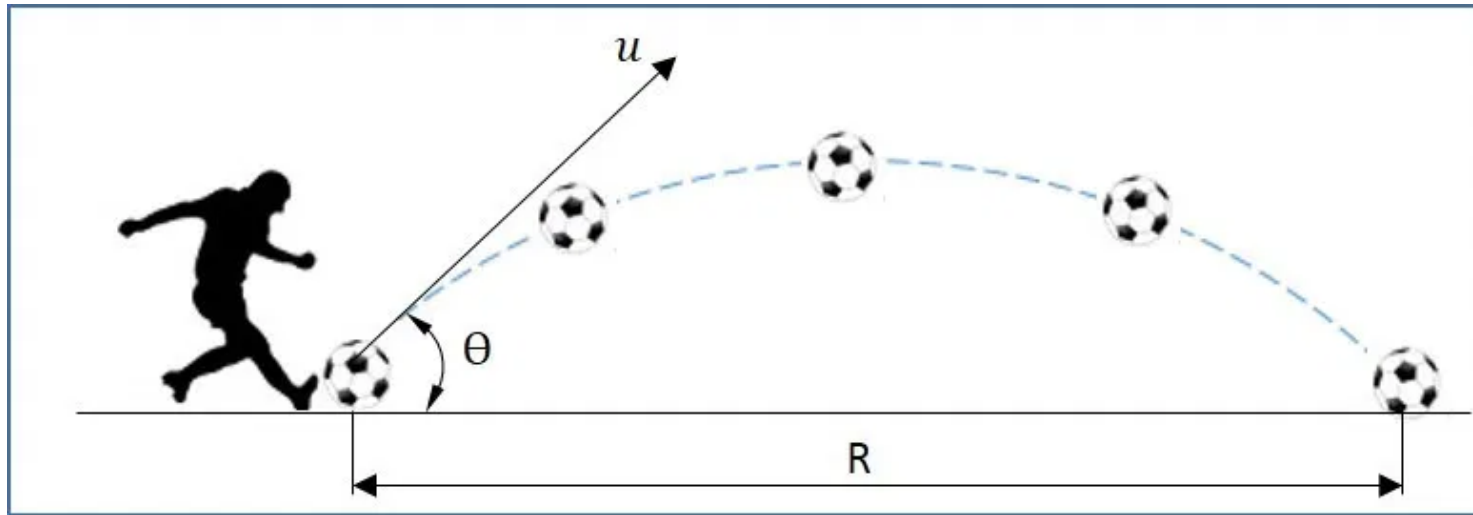
“How does our modern technological world work?”

Miguel F. Morales

Course threads

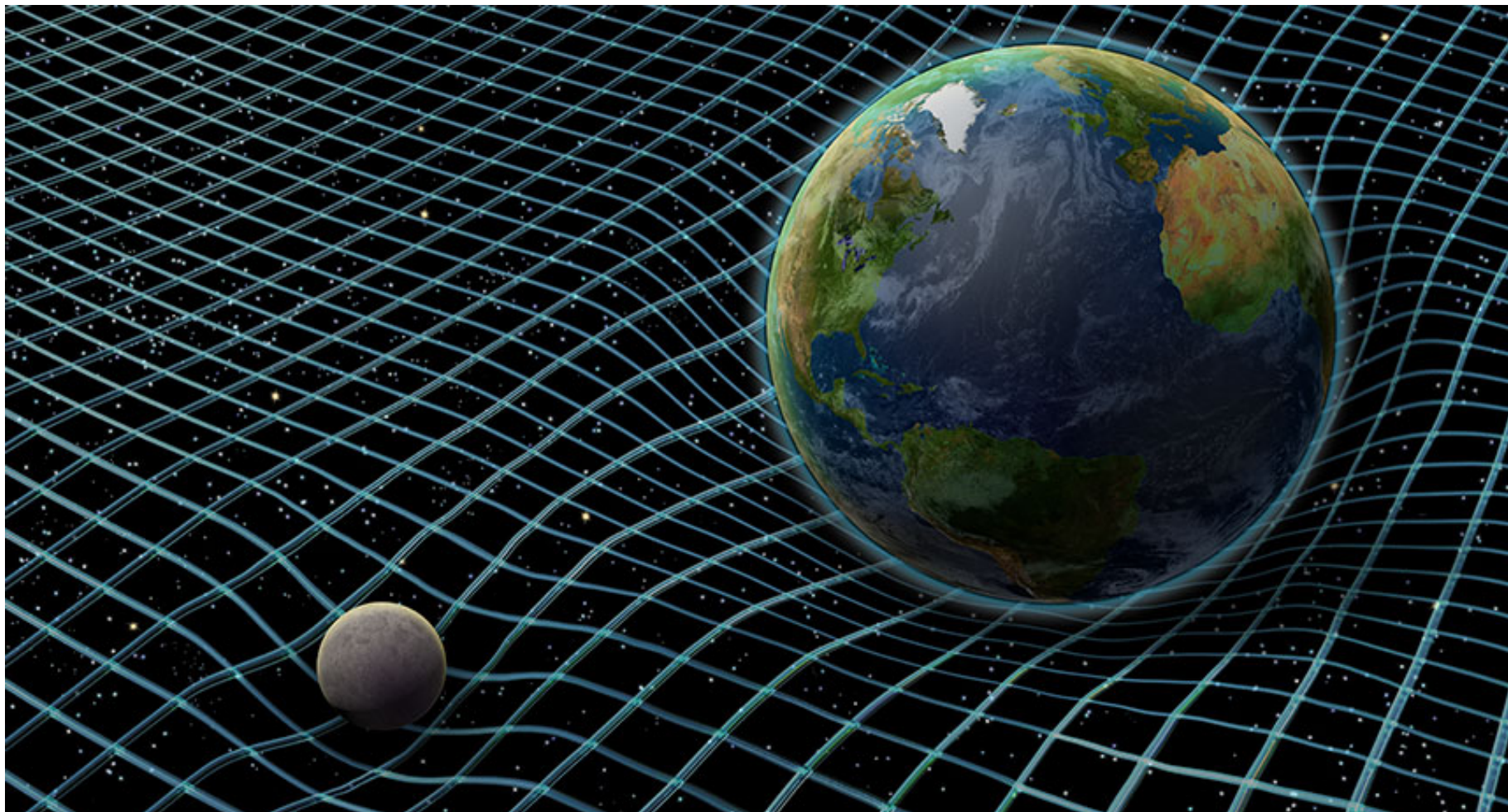
- Physics
- History of measurement & quantitative knowledge
- How our technological world works

Physics



Classical physics

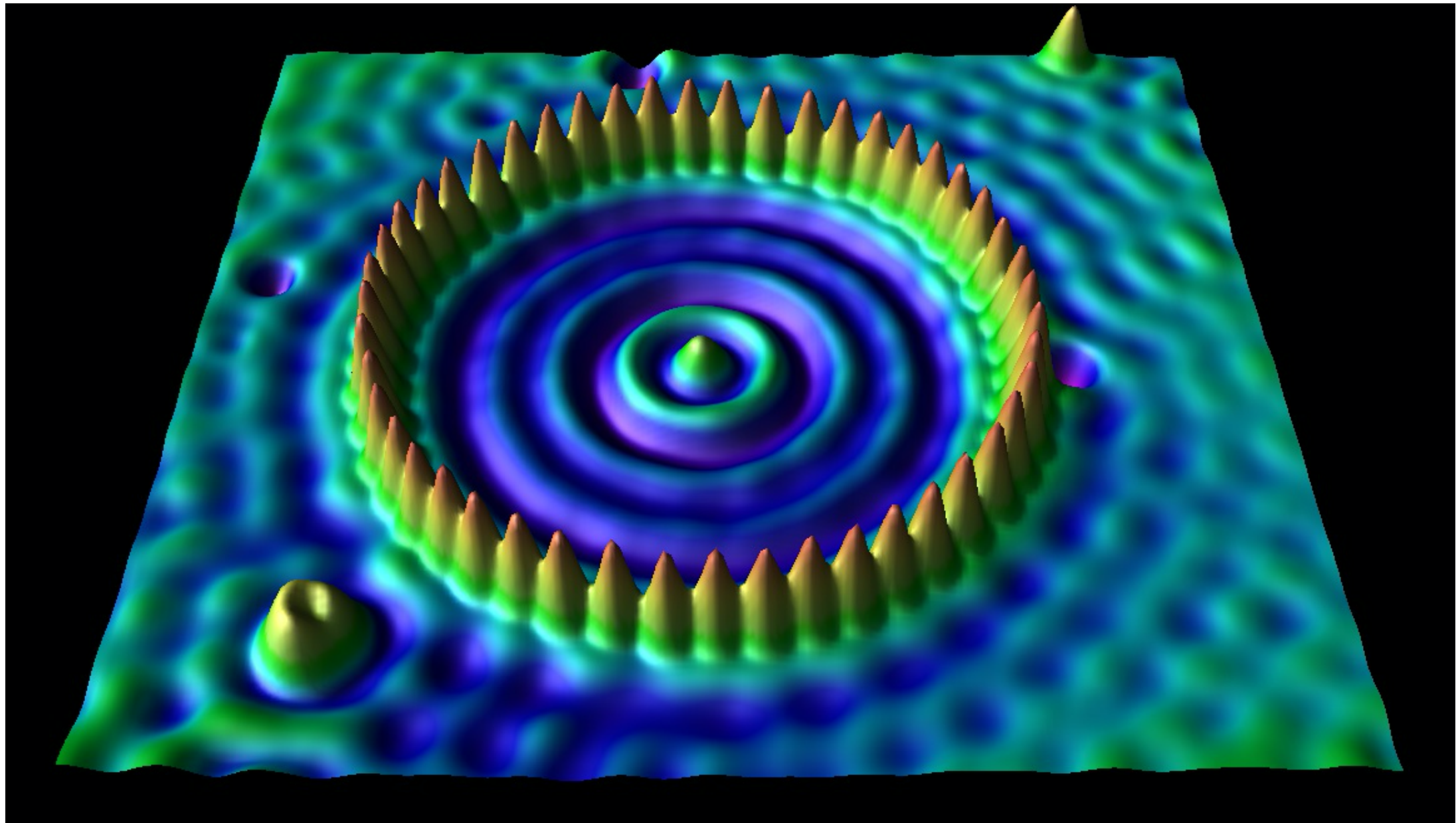
Physics



$$E = mc^2$$

Special & General Relativity

Physics



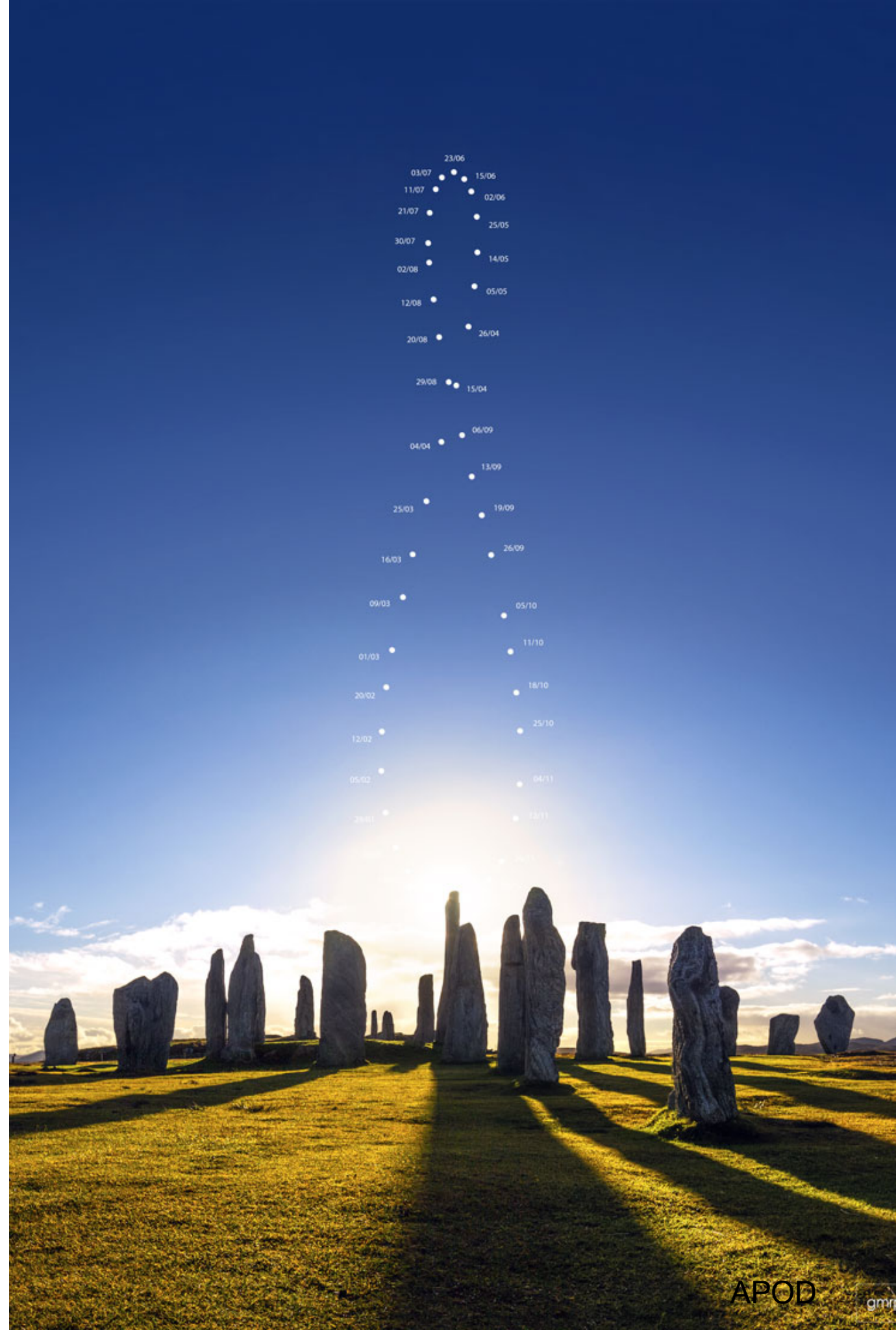
Quantum Mechanics

Weekly plan

- Start each week with physics
- End each week with how this physics appears in our technological world & the history of measurement

Week 1

- Introduction, Eratosthenes
- Earth's orbital motion, Analemmas
- Ancient way-finding
- The problem of longitude & Harrison's clock



JANUARY

GIRLS IN KUTUPALONG, BANGLADESH, THE LARGEST
REFUGEE CAMP HOUSING ROHINGYA REFUGEES

Photo by Paula Bronstein / Getty Images

S M T W T F S

DECEMBER 2019

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

FEBRUARY 2020

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
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1

NEW YEAR'S DAY

2

BODHI DAY

3

4

5

6

Intro
Evolution

7

What time
is it?
E rot., sidereal,
analemma, sol
& stellar along.

8

9

Where am I?
Ancient
way finding.

10

Long. &
clocks.

11

A

12

13

Waves

14

What is light?
(or a particle?)

15

16

pt 2.
(single photon)

17

Electromagnetic
spectrum &
telescope.
pt 1.

18

B

19

20

MARTIN LUTHER
KING JR. DAY

21

Speed of light.
galilean moons
map

22

23

Special Rel.

24

Surveying
& Geodimeter.

25

D
(helps bridge)

26

27

Parakee
Melling pot
INTERNATIONAL
HOLOCAUST
REMEMBRANCE DAY

28

29

30

Better clocks
quartz, atomic,
optical,
UTC, atomic,
variations
in earth's spin

31

GPS.
UTC, atomic,
etc.
variations on
earth's speed.

E or
worksheet on
ground movement.

AMNESTY



www.amnestyusa.org

Last homework

- Diagram all the treads connecting the lectures (creativity a plus)
- Pick your favorite thread and in ~1 page describe the connections

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LUNAR NEW YEAR

E or
worksheet on
ground movement.

Grades

- Reading quizzes
- Homework
- Midterms (Feb 2nd & Mar 2nd)
- Final Paper

Promises

- No math
- No philosophy
- Everything we encounter will be experimentally verified

Hopes

- Name
- Class & what you are studying
- What you are passionate about

Hopes

Nevaeh Sinahi Anderson

Simone O'Sullivan Anguera

Joel Bullard

Tanner Thomas Callies

Emily C Chen

Fangzhou Deng

Tami Farrer

Yi Feng

Ardon Fryer

Audrey M Hogan

Zinnia Huerta

Charles Huneycutt

Faith Elizabeth Jacob

Casey Alderete Johnstone

Grace L Kent

Marley Olan Laws

Alice Liu

Hsiao Yun Liu

Shalinie Marinaa Lopez

Alex Allen Maurer

Nicholas Robert Mcarthur

Jorge Melchor

Natalie Robin O'Rourke

Paulina Orrantia

Zeke Neil Pelluer

Abbott Wolf Phinney

Noah Prado

Grishma Shindhe

Aiden Marina Smith

Sidney Kathy Spencer-Mylet

Tokala Tatum

Jasmine Tra Mi Tran

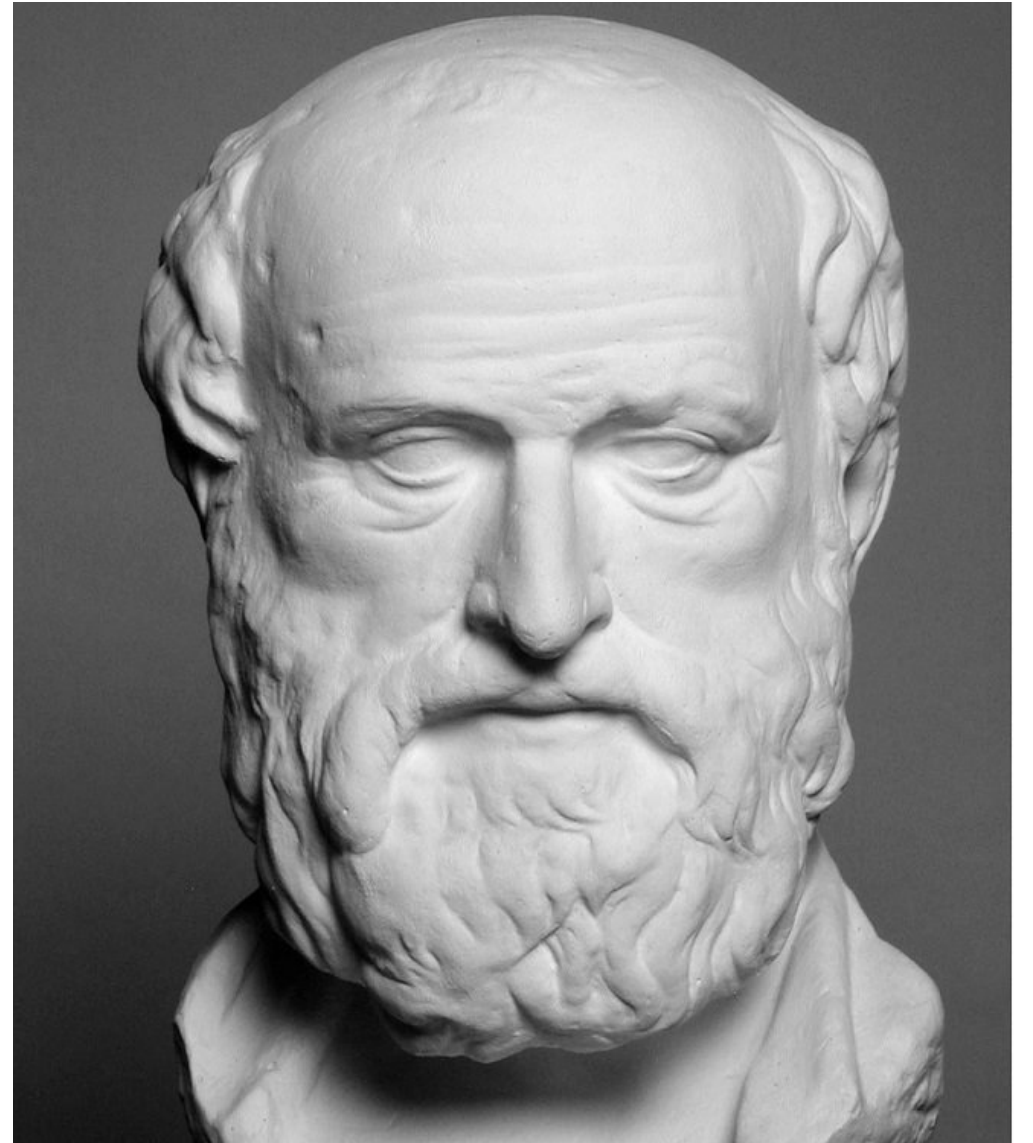
Christian Vargas

Dom Wilbur

Phillip Zhang

- **Name**
- **Class & what you are studying**
- **What you are passionate about**

Eratostrhenes 276–194 BCE



Eratostrhenes

- Chief librarian of the Library of Alexandria
- Invented geography and chronology
- Poet, astronomer, etc.
- Very good at nearly everything (beta)



Bernardo Strozzi

Library of Alexandria



Size & shape of the Earth



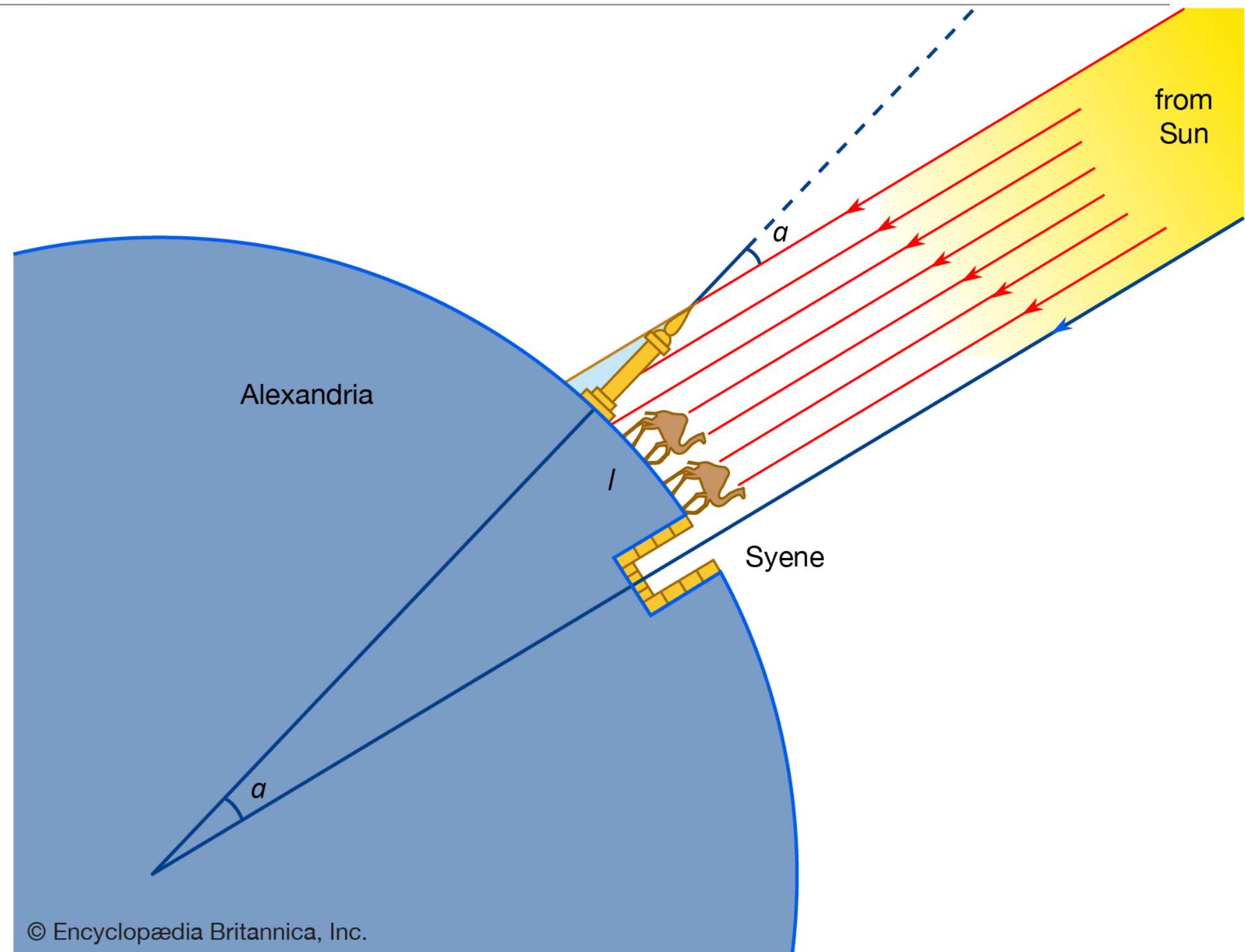


Well at Kom Ombo

Size & shape of the Earth



Calculating the size



Ancient evidence for spherical earth

- Change in shadows with latitude
- Phases of the moon, showing spherical moon
- Shadow of the Earth during lunar eclipse
- Lunar eclipses appear in different locations with longitude
- Solar eclipses appear differently depending on location



History & myths of a round earth

- ‘Discovered’ by Columbus (or Magellan)
- Known by every educated individual in the western world since before the birth of Christ
- Accurately known (few percent) since Eratosthenes

Tomorrow: Analemmas, seasons, and the motion
of the Earth