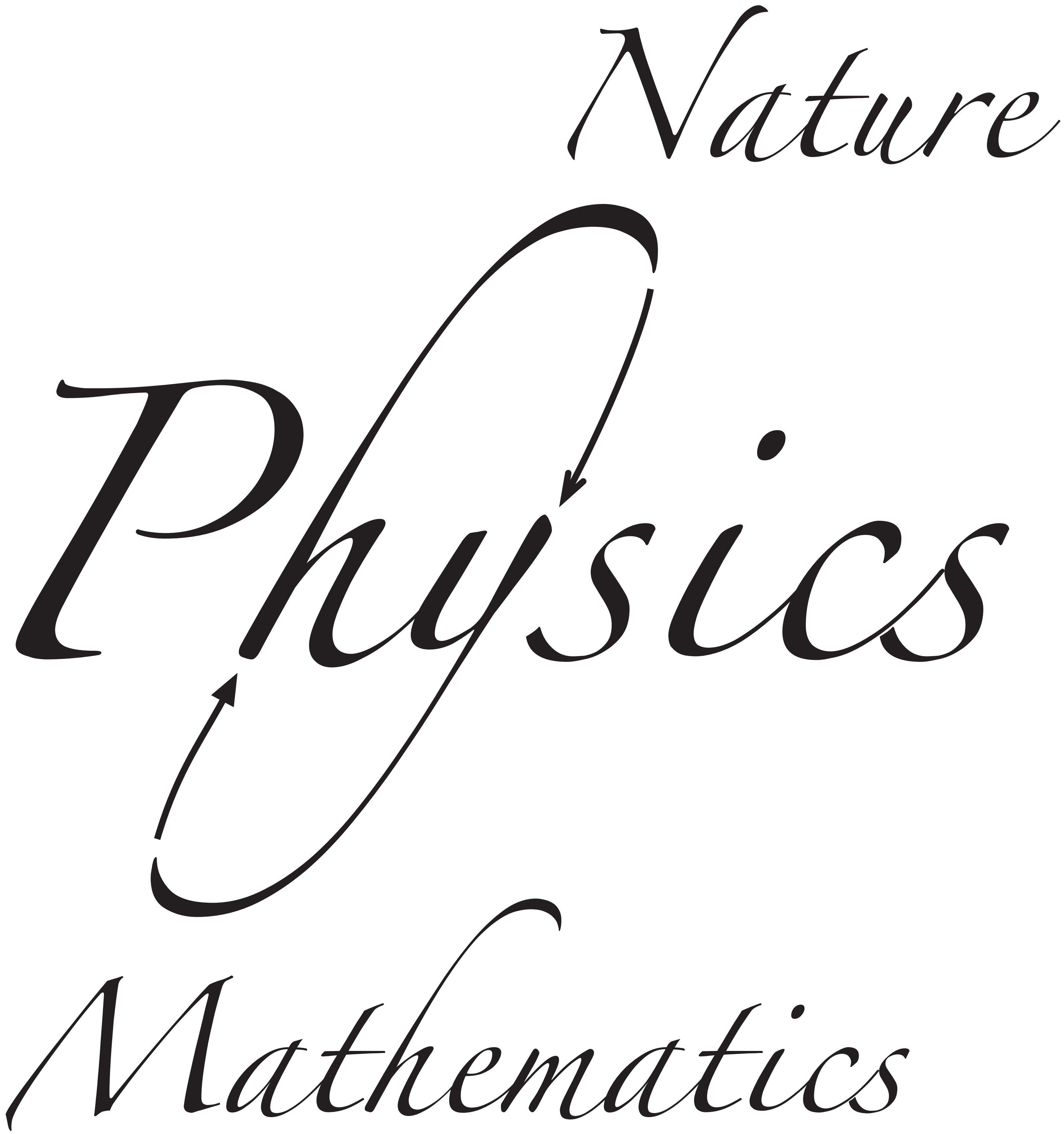
The Collapsing Universe

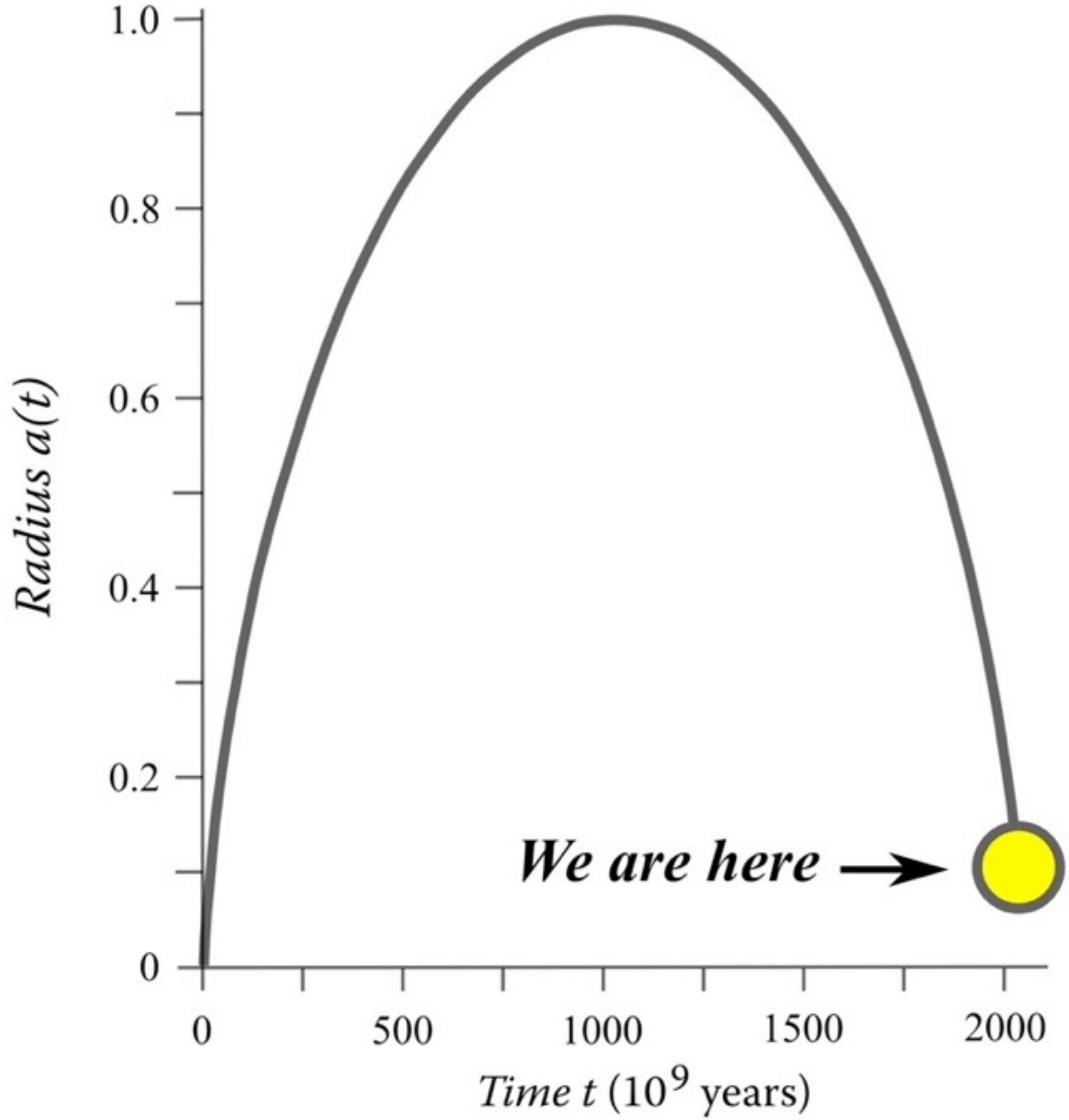
Understanding "accelerating redshifts" using physics from the 1920's

Bill Sumner

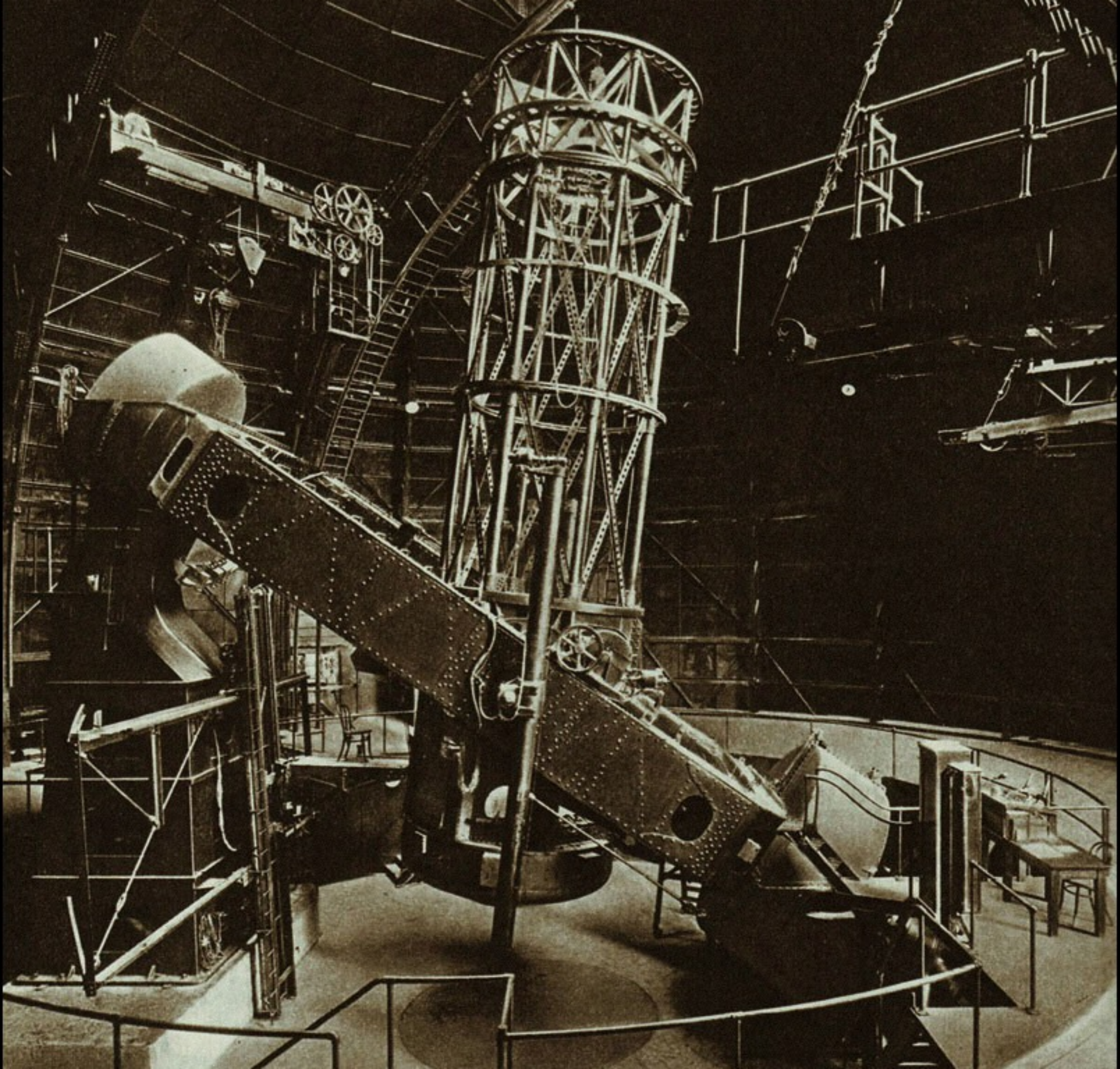
Ellensburg High School

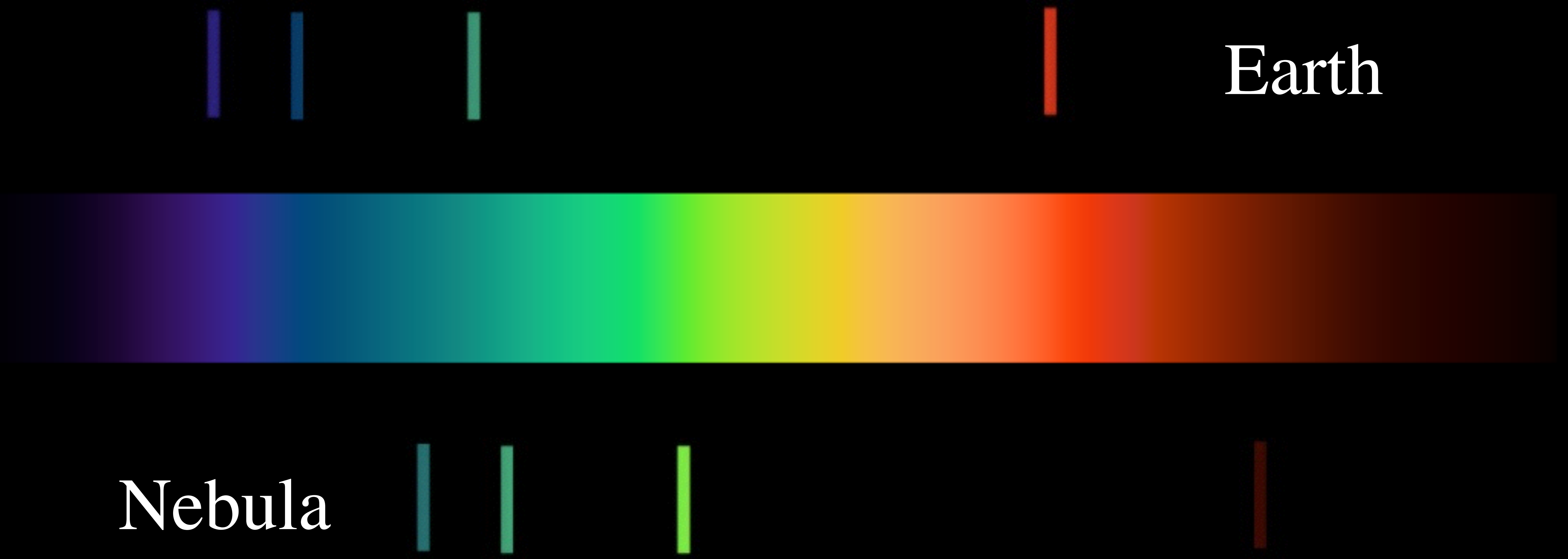
June 4, 2015


Nature
Physics
Mathematics



Time to collapse
~9.5 billion years




Earth
Nebula

A RELATION BETWEEN DISTANCE AND RADIAL VELOCITY AMONG EXTRA-GALACTIC NEBULAE

By Edwin Hubble

Mount Wilson Observatory, Carnegie Institution of Washington

Communicated January 17, 1929

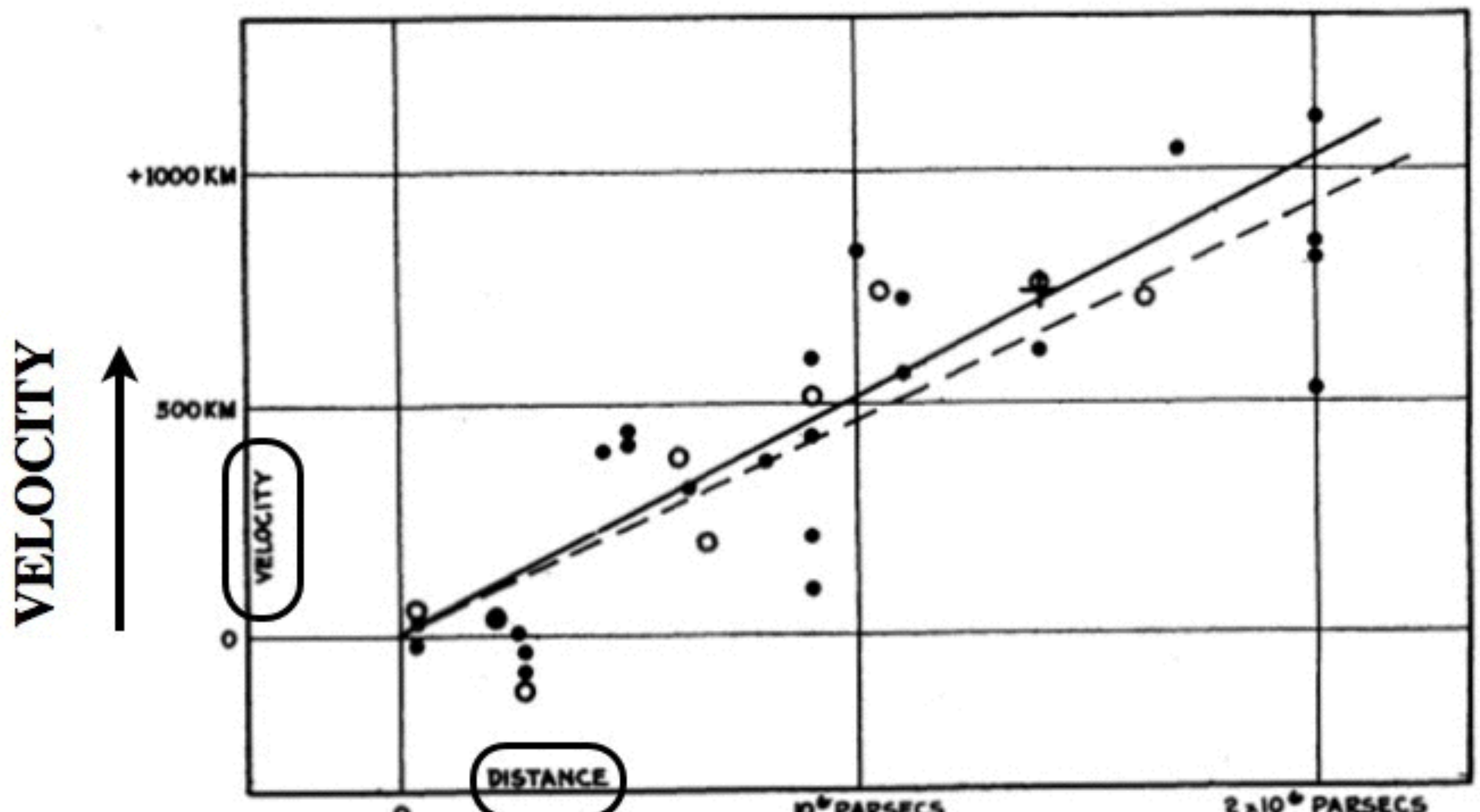
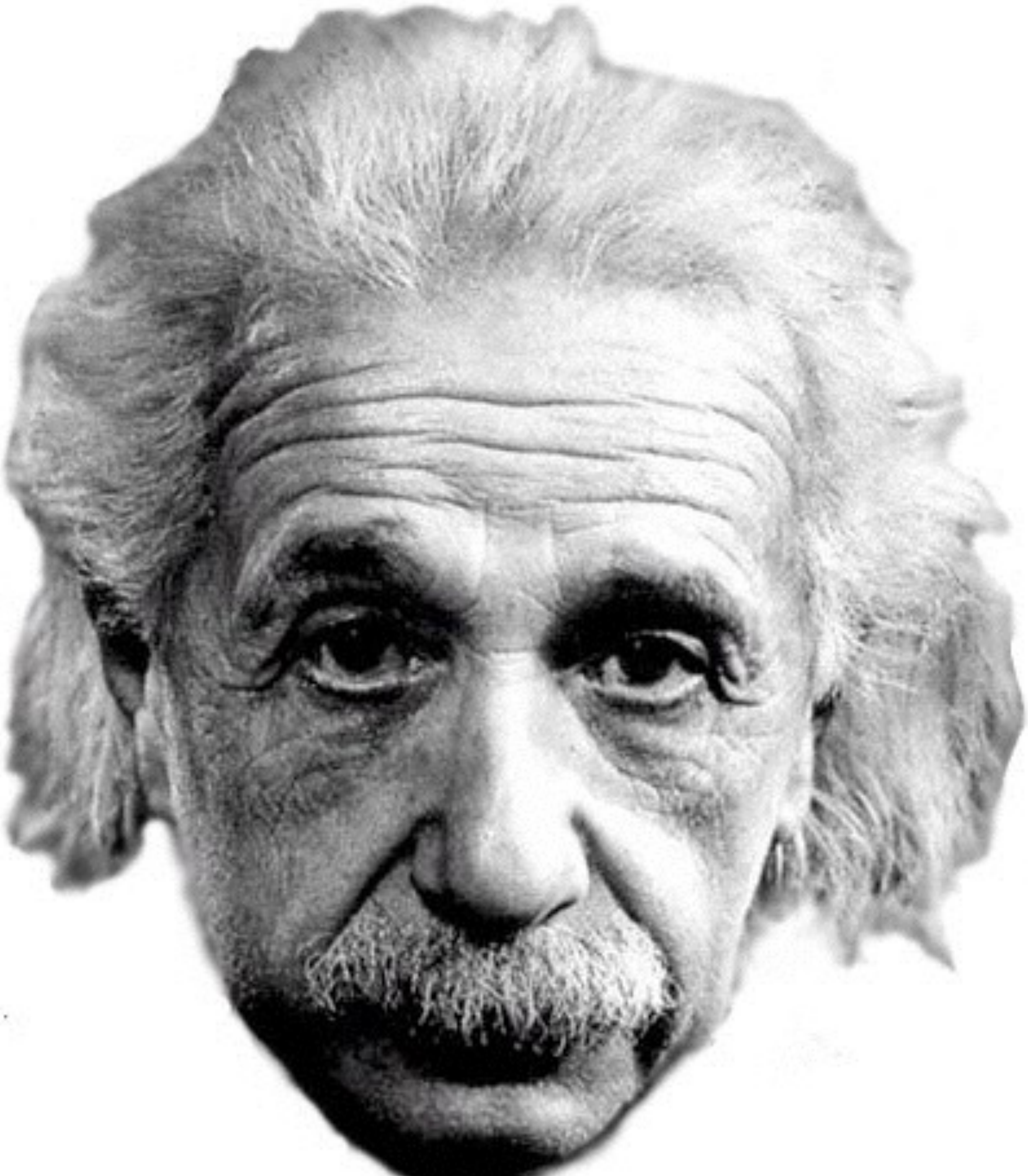
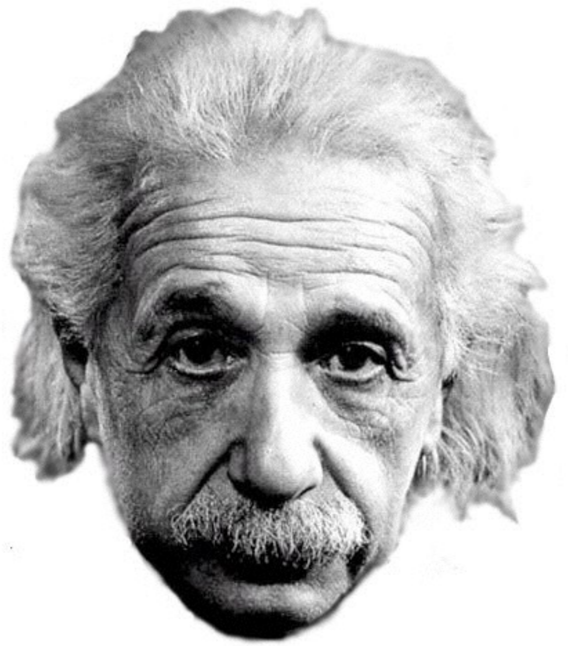


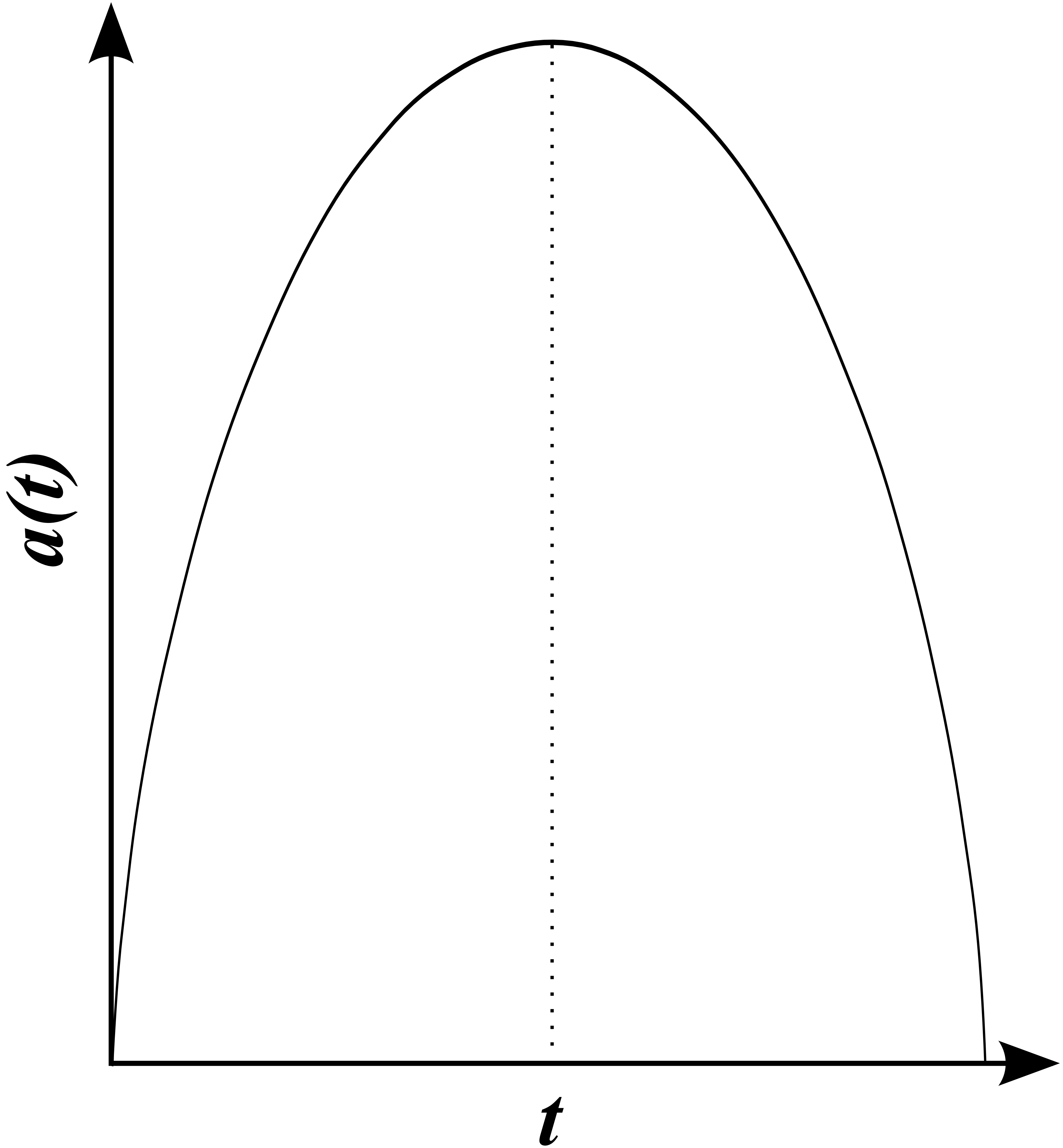
FIGURE 1

DISTANCE

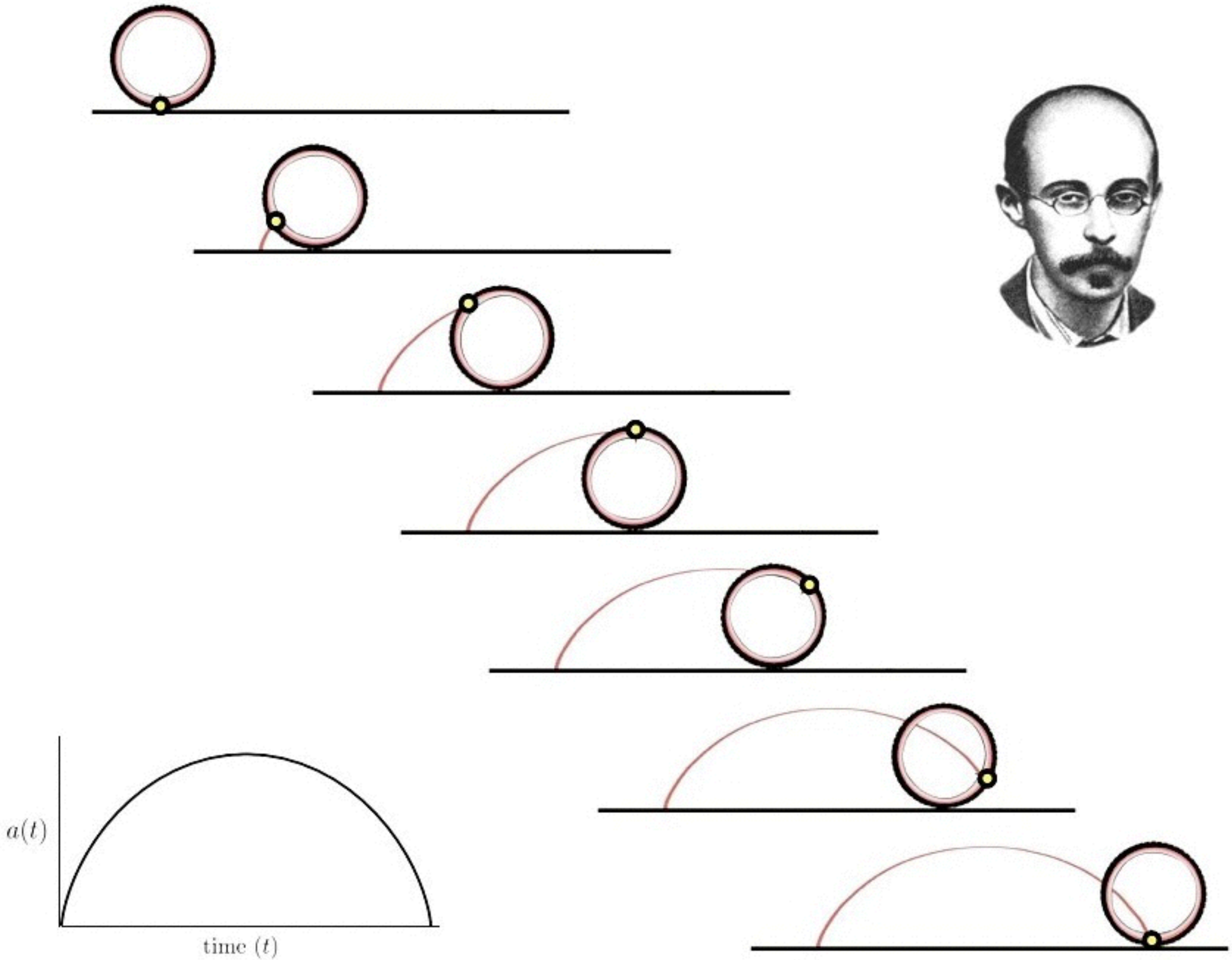




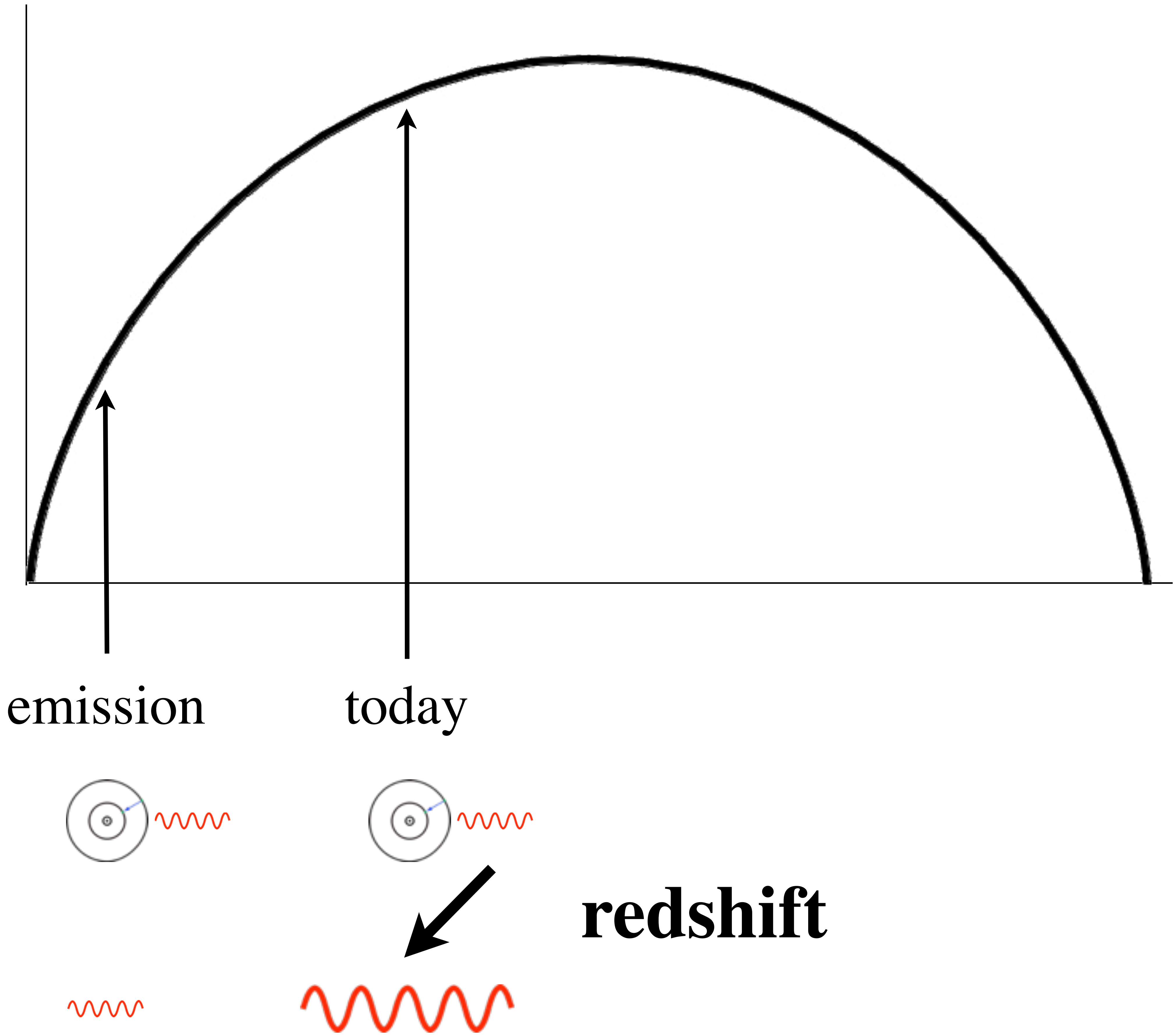
(Curvature of geometry) = (Mass)



a(t)
t

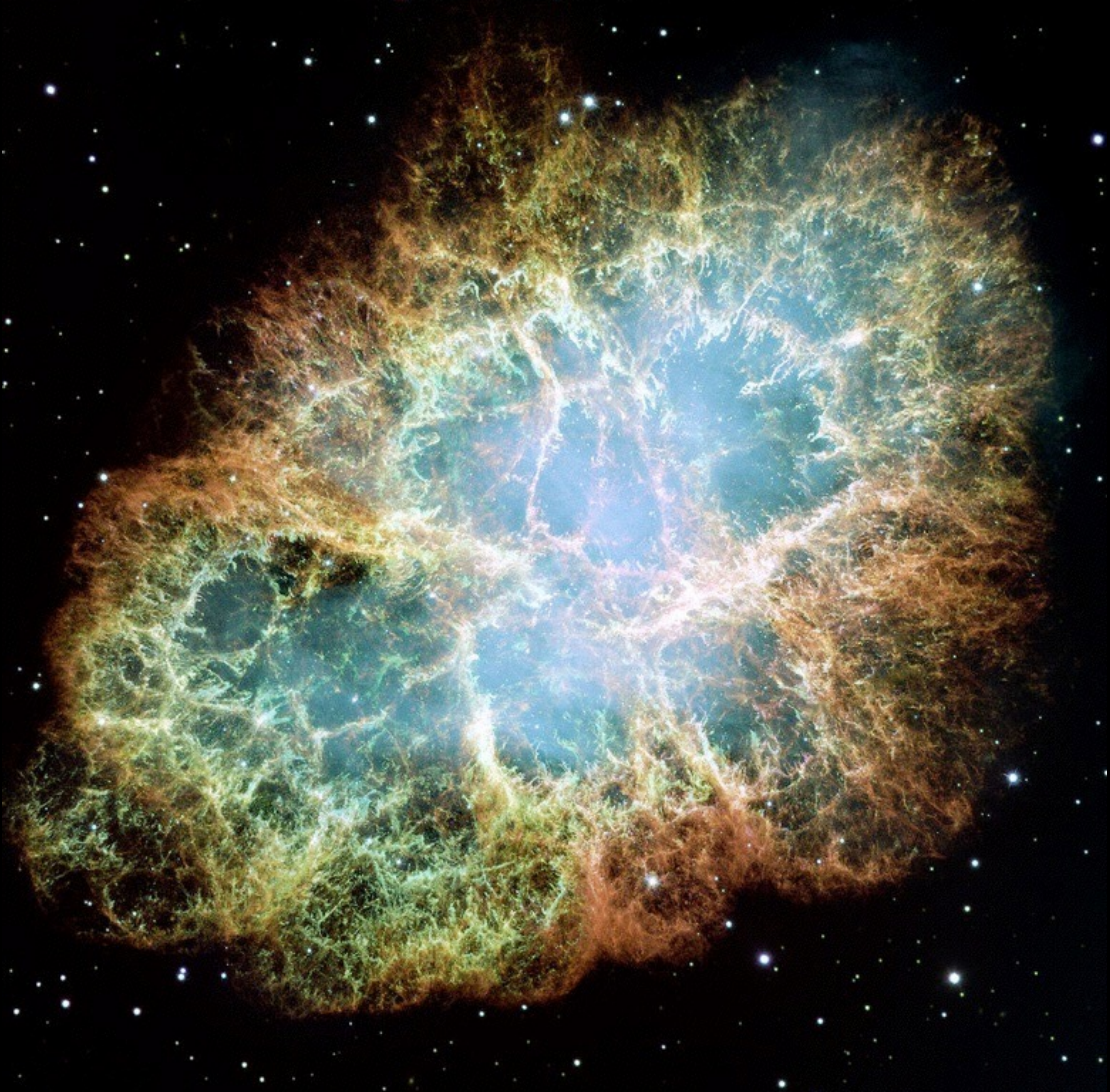


$a(t)$
time (t)


emission
today
redshift


esa

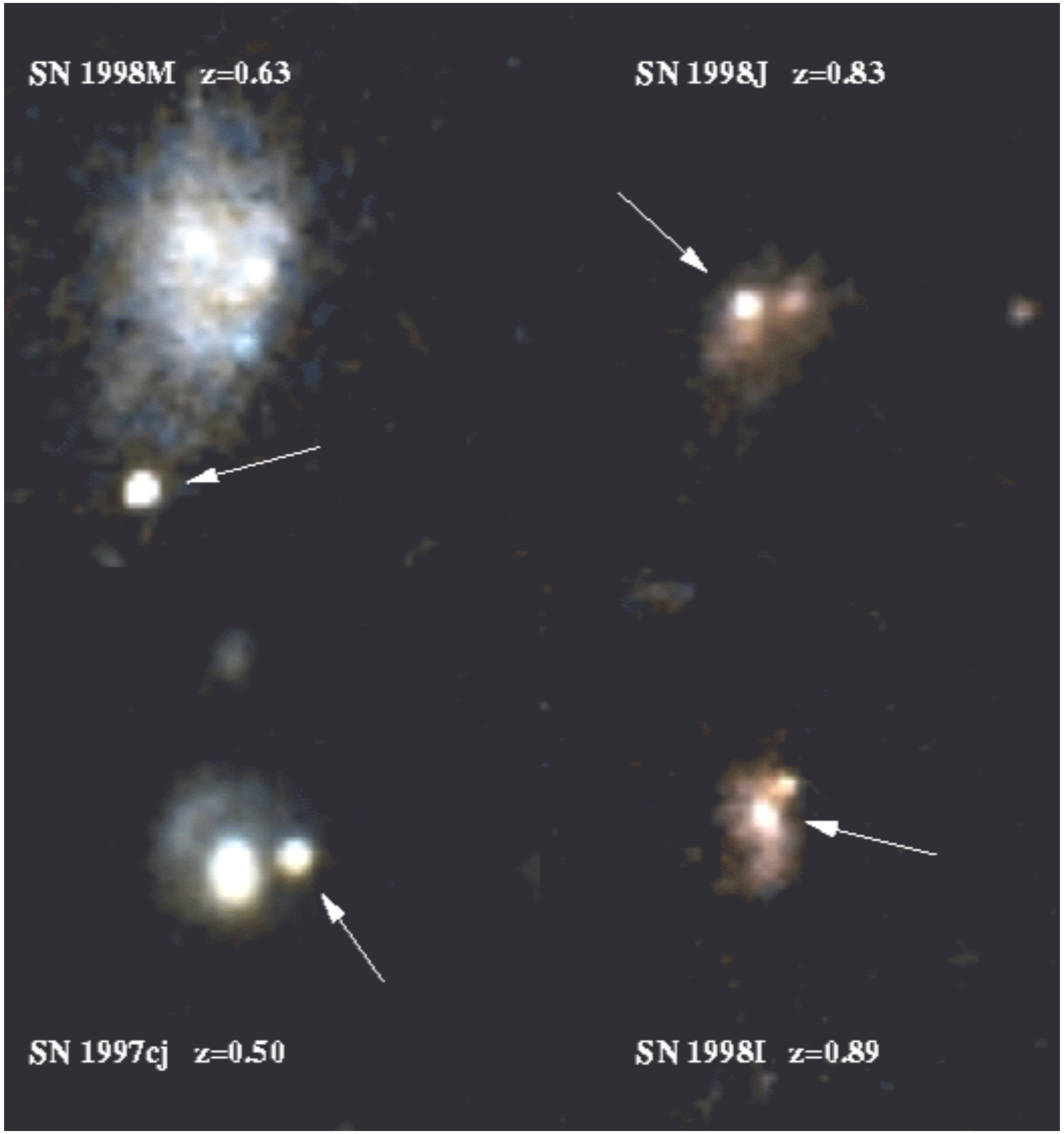

SN 2011dh

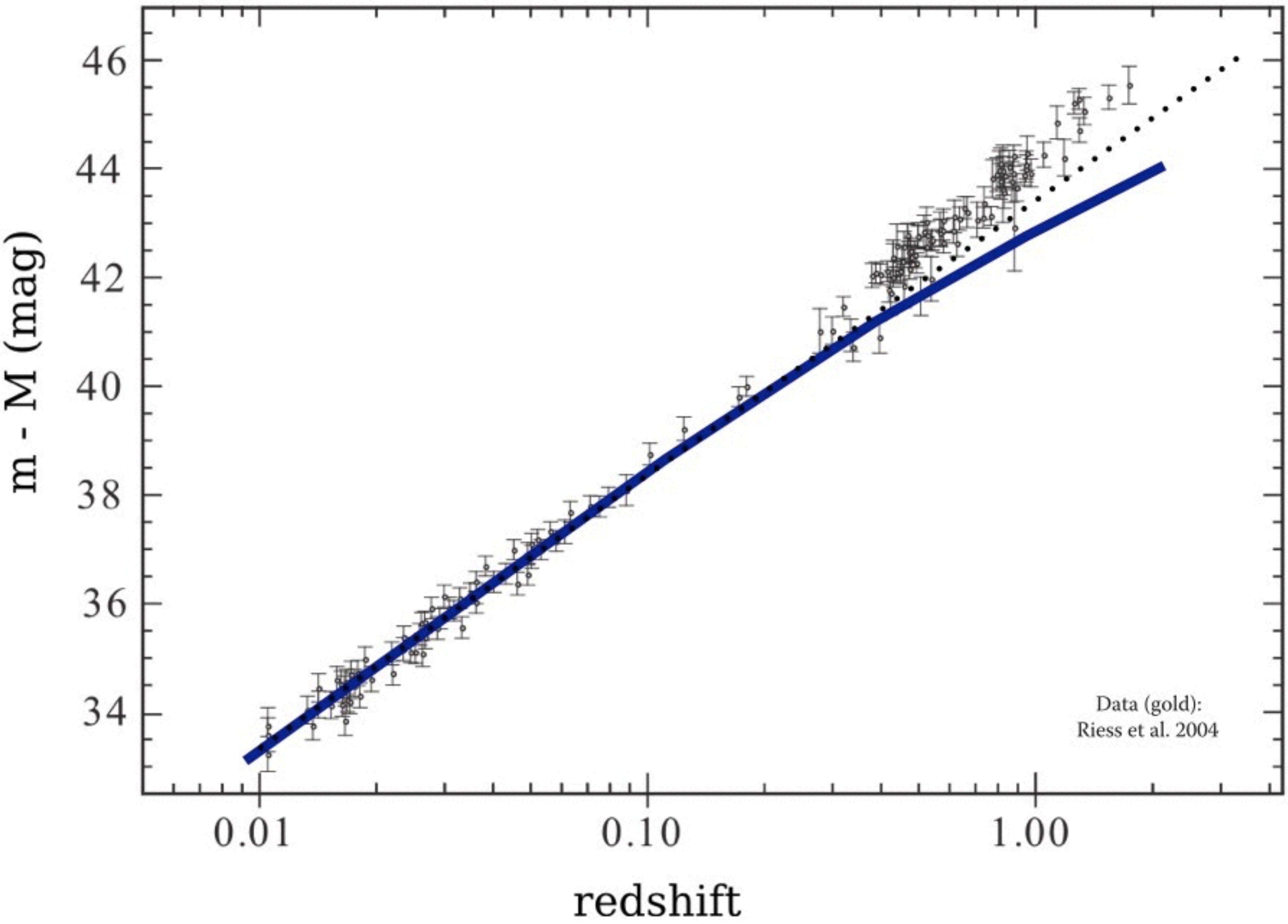


Examples of High-Redshift SNe

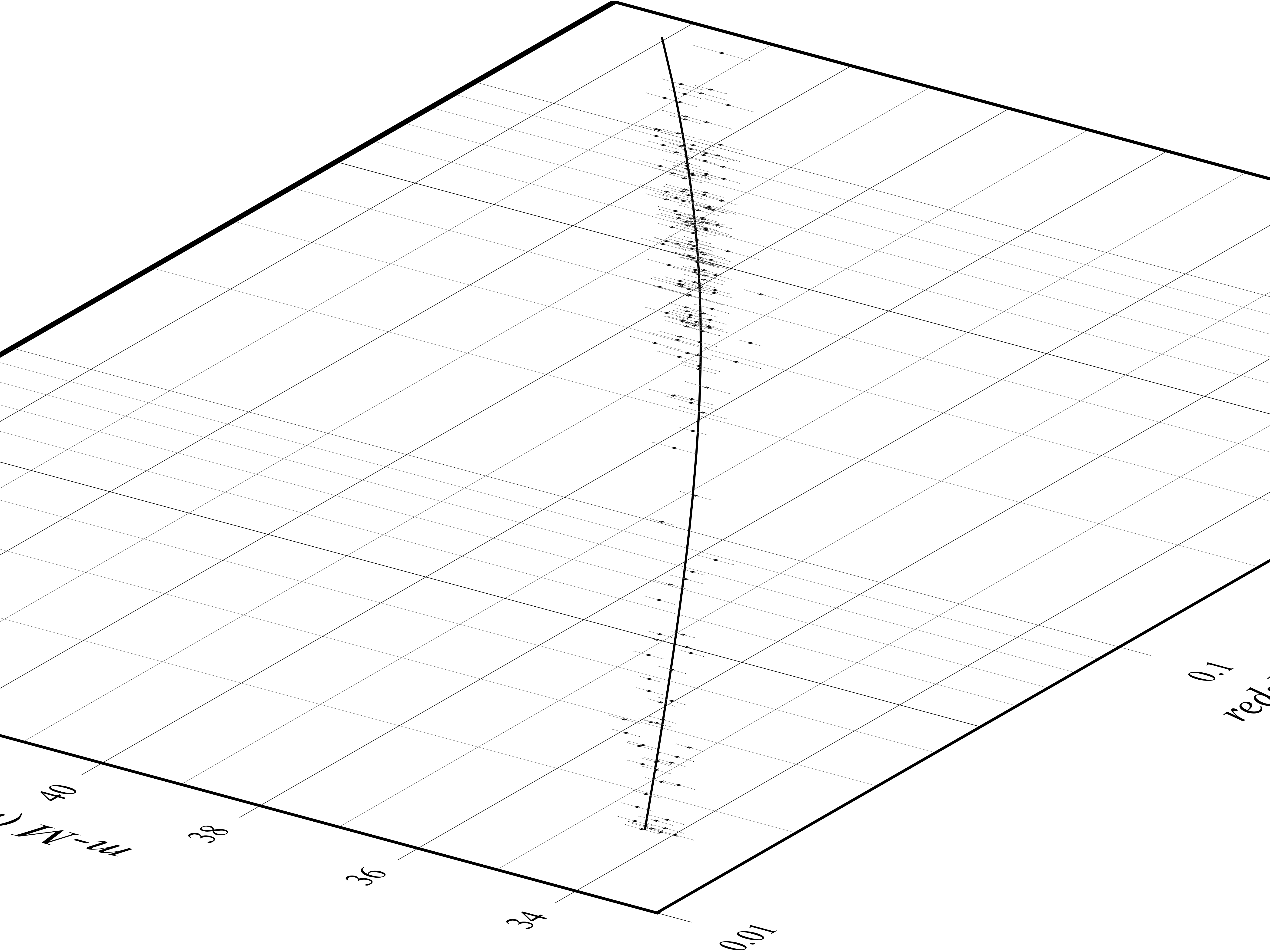
HST observations of SNe in distant galaxies
(Riess et al.)

Note: you need to …
- Detect them
- Measure the light curves
- Do the K-corrections
- Get the redshifts



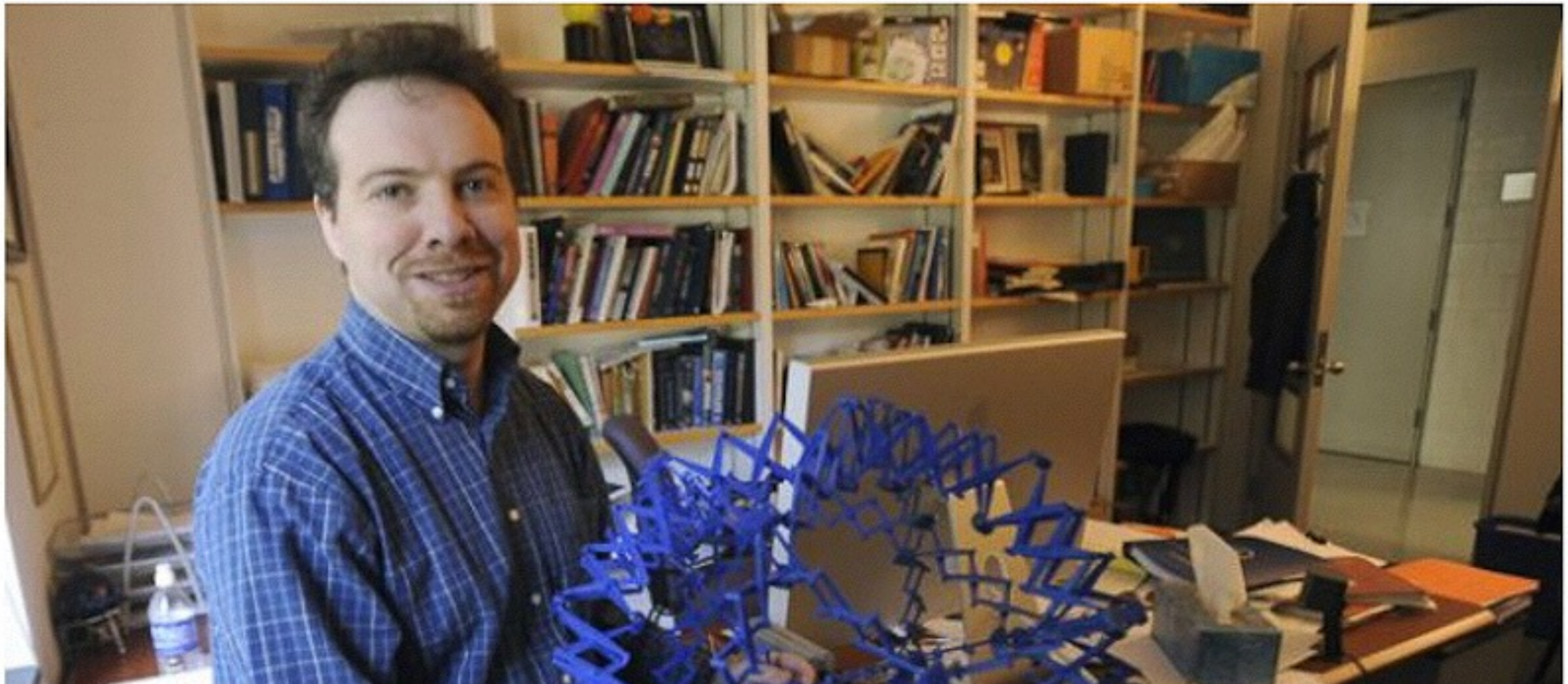


46
44
42
40
38
36
34
m - M (mag)
0.01
0.10
1.00
redshift
Data (gold):
Riess et al. 2004


40
38
36
34
0.01
0.1

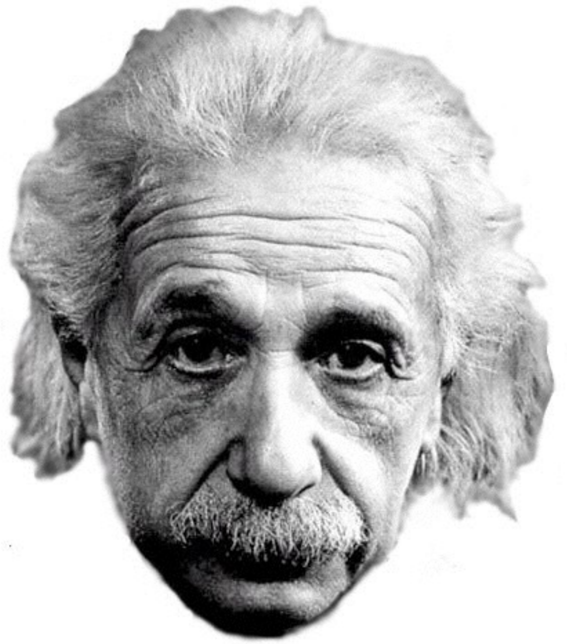
Three Americans Share 2011 Nobel Prize in Physics

Published October 04, 2011 / Associated Press



The Royal Swedish Academy of Sciences says American Saul Perlmutter, U.S.-Australian citizen Brian Schmidt and U.S. scientist Adam Riess (pictured here in 2008) share the 2011 Nobel Prize in physics. The trio were honored Tuesday, Oct. 4, 2011 "for the discovery of the acclerating expansion of the universe through observations of distant supernovae." (AP PHOTO/THE JOHN D. AND CATHERINE T. MACARTHUR FOUNDATION, GAIL BURTON)

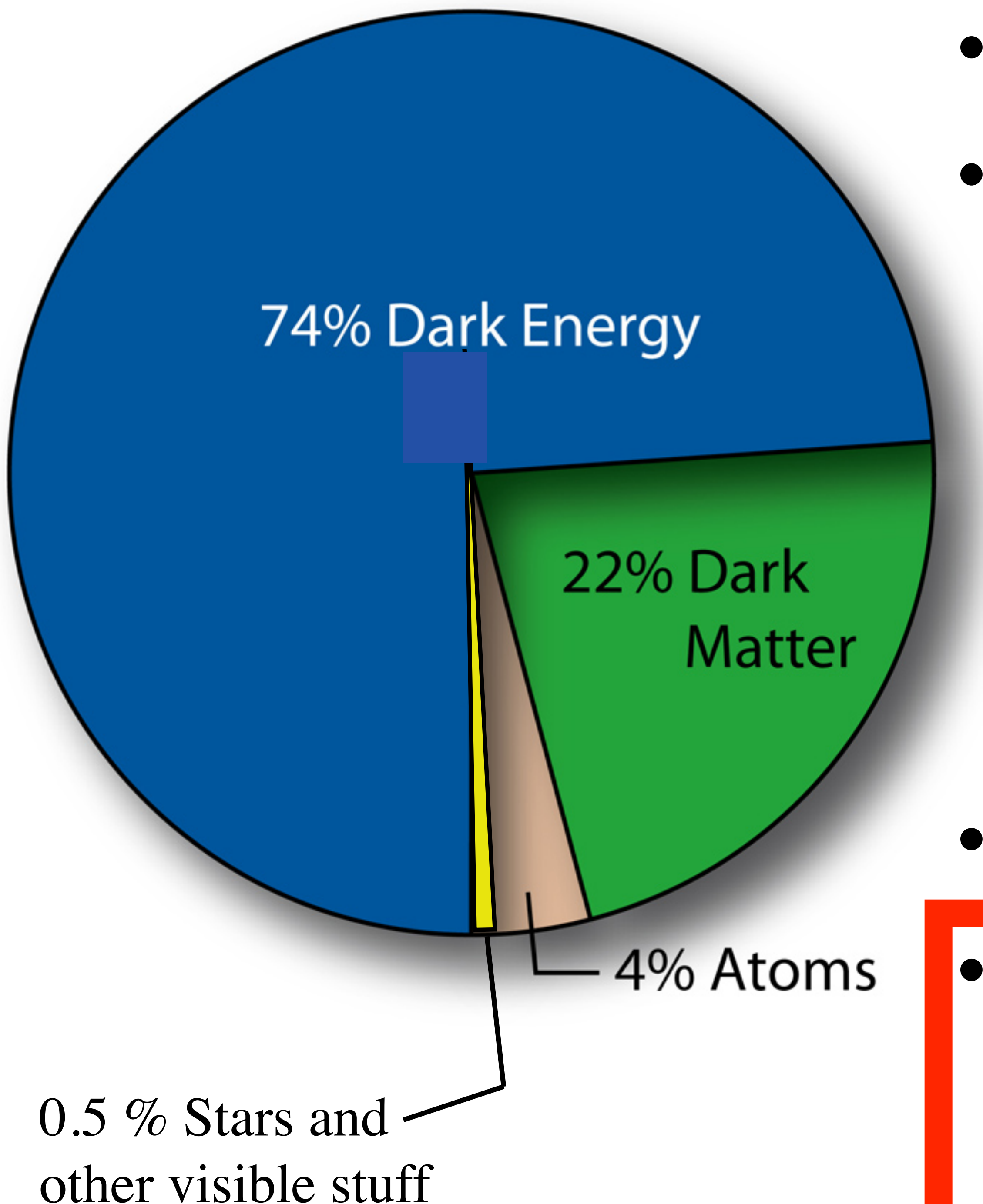
STOCKHOLM – Three U.S.-born scientists won the Nobel Prize in physics Tuesday for discovering that the universe is expanding at an accelerating pace, a stunning revelation that suggests the cosmos will eventually freeze to ice.



(Curvature of geometry) = (Mass)

+ X

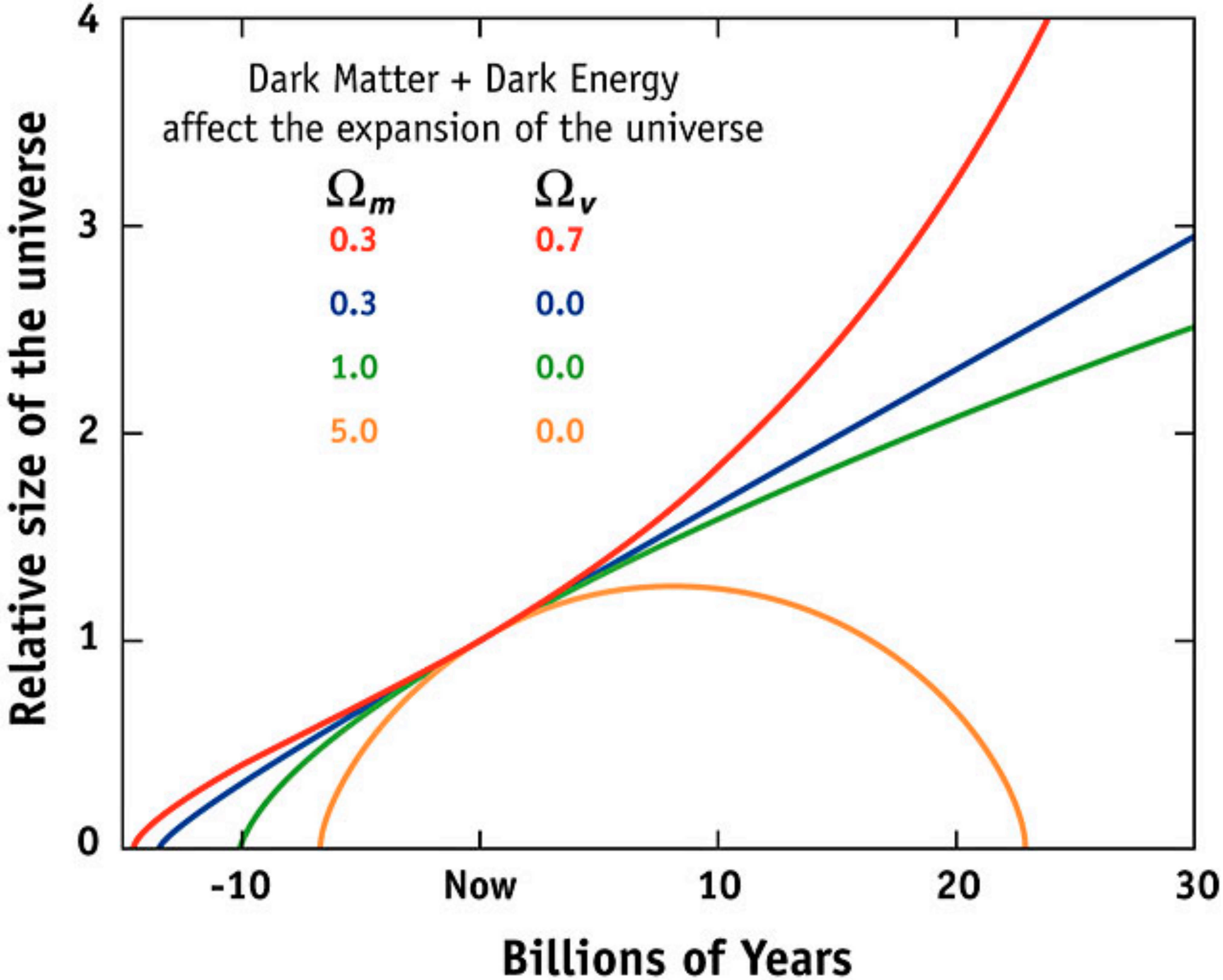
Contents of the Universe: Summary



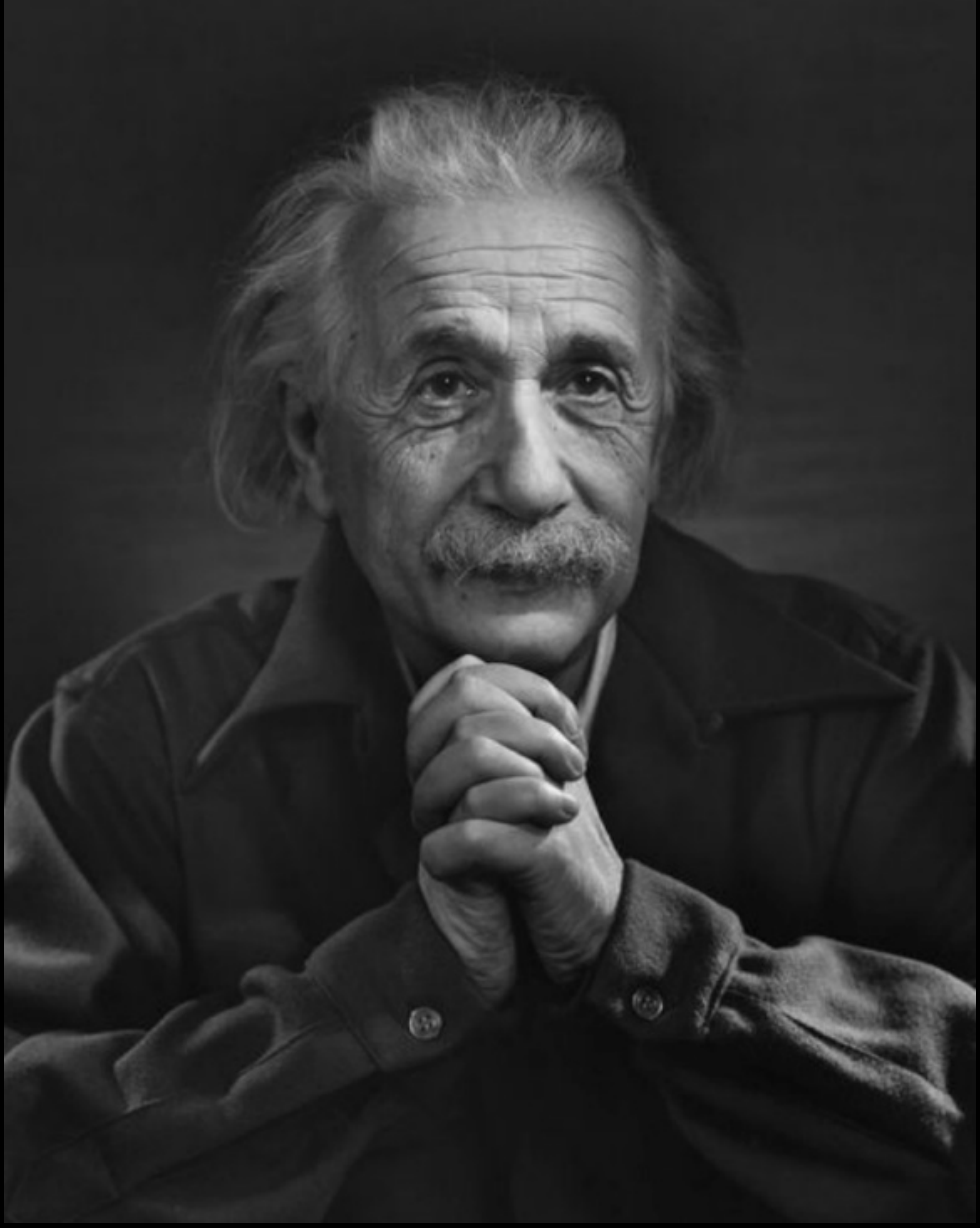
- $\Omega_0 = 1.00 \pm 0.02$
- $\Omega_m \approx 0.27 \pm 20\%$
  - $\Omega_b \approx 0.045 \pm 10\%$
    - Includes $\Omega_{visible} \approx 0.005$
  - $\Omega_{non\text{-}b} \approx 0.22$
    - Includes $\Omega_\nu < 0.005$
  - $\Omega_{CMBR} \approx 0.0001$
- $\Omega_{de} \approx 0.73 \pm 10\%$

- The physical nature of the DE is currently completely unknown

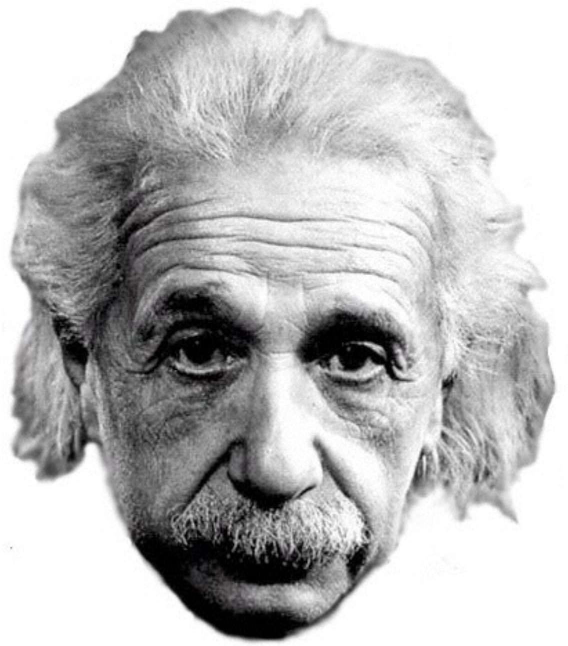
Matter Dominated Model



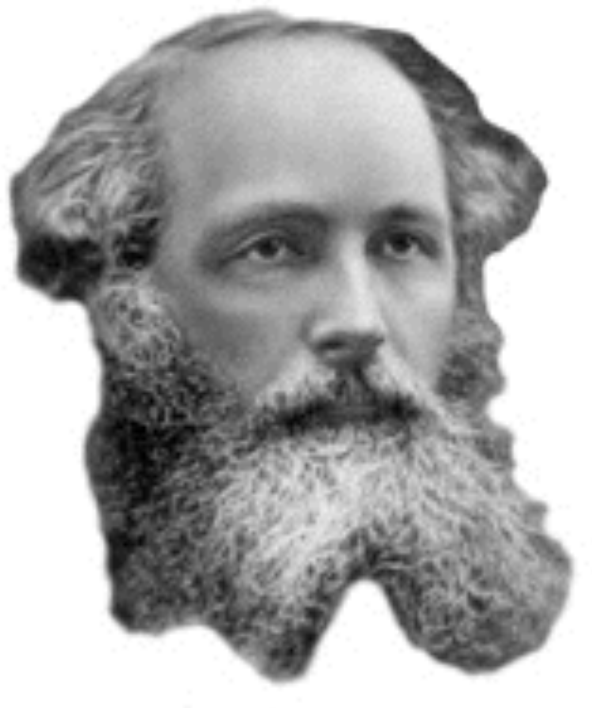

DANZAS



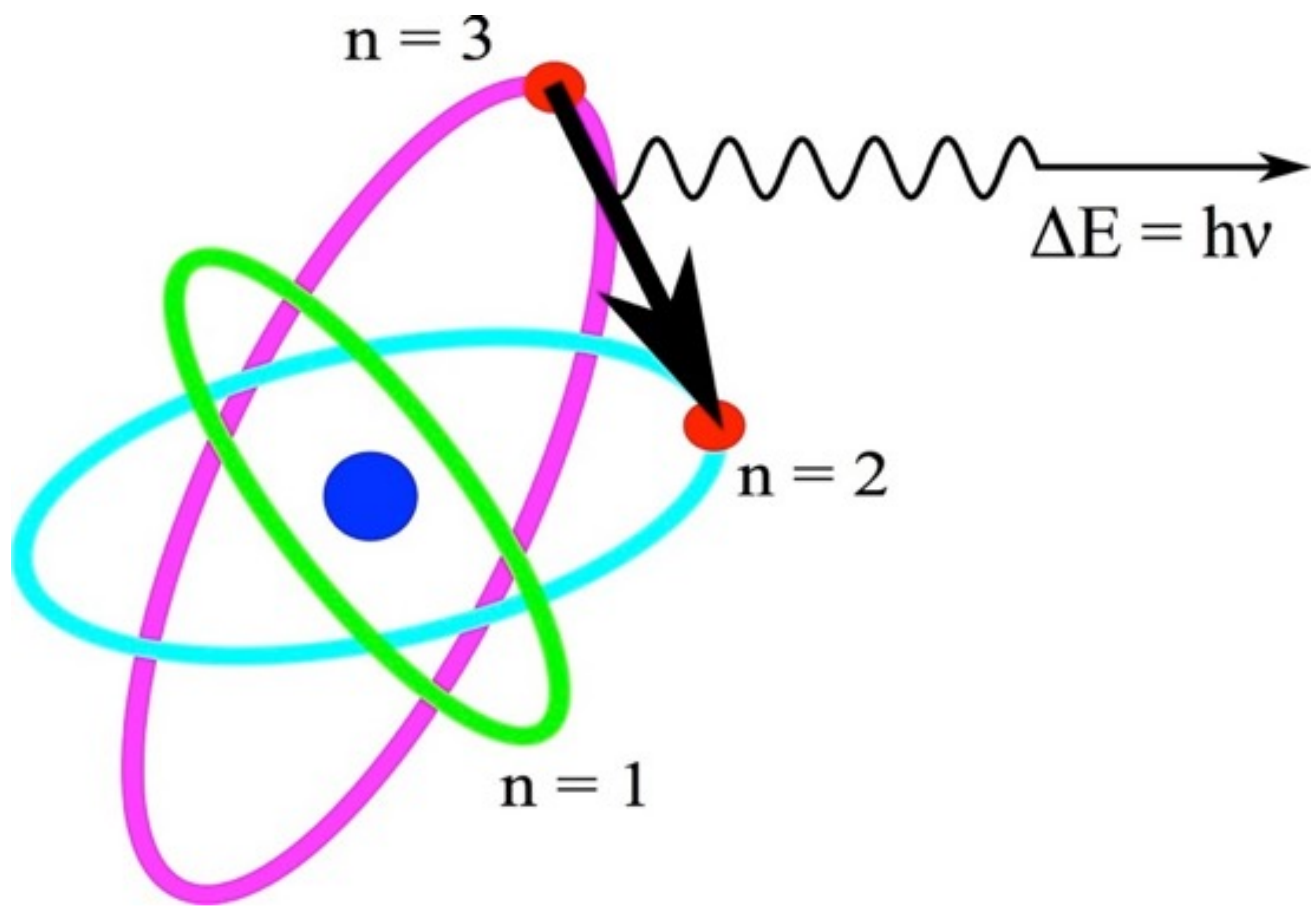

29 30 31

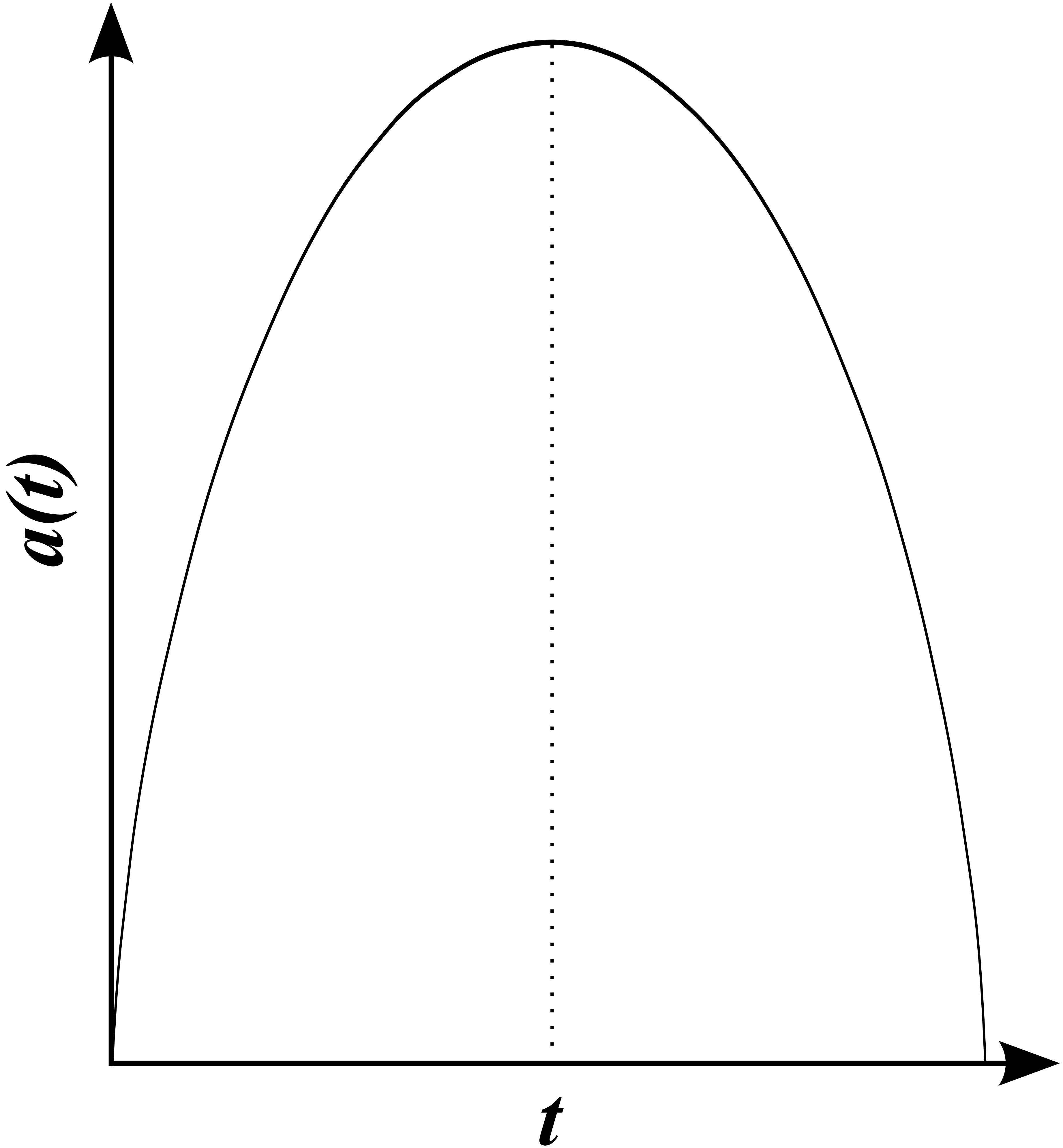


(Curvature of geometry) = (Mass)



$$|\mathbf{F}| = \frac{1}{4\pi\varepsilon}\frac{|q_1\,q_2|}{r^2}$$

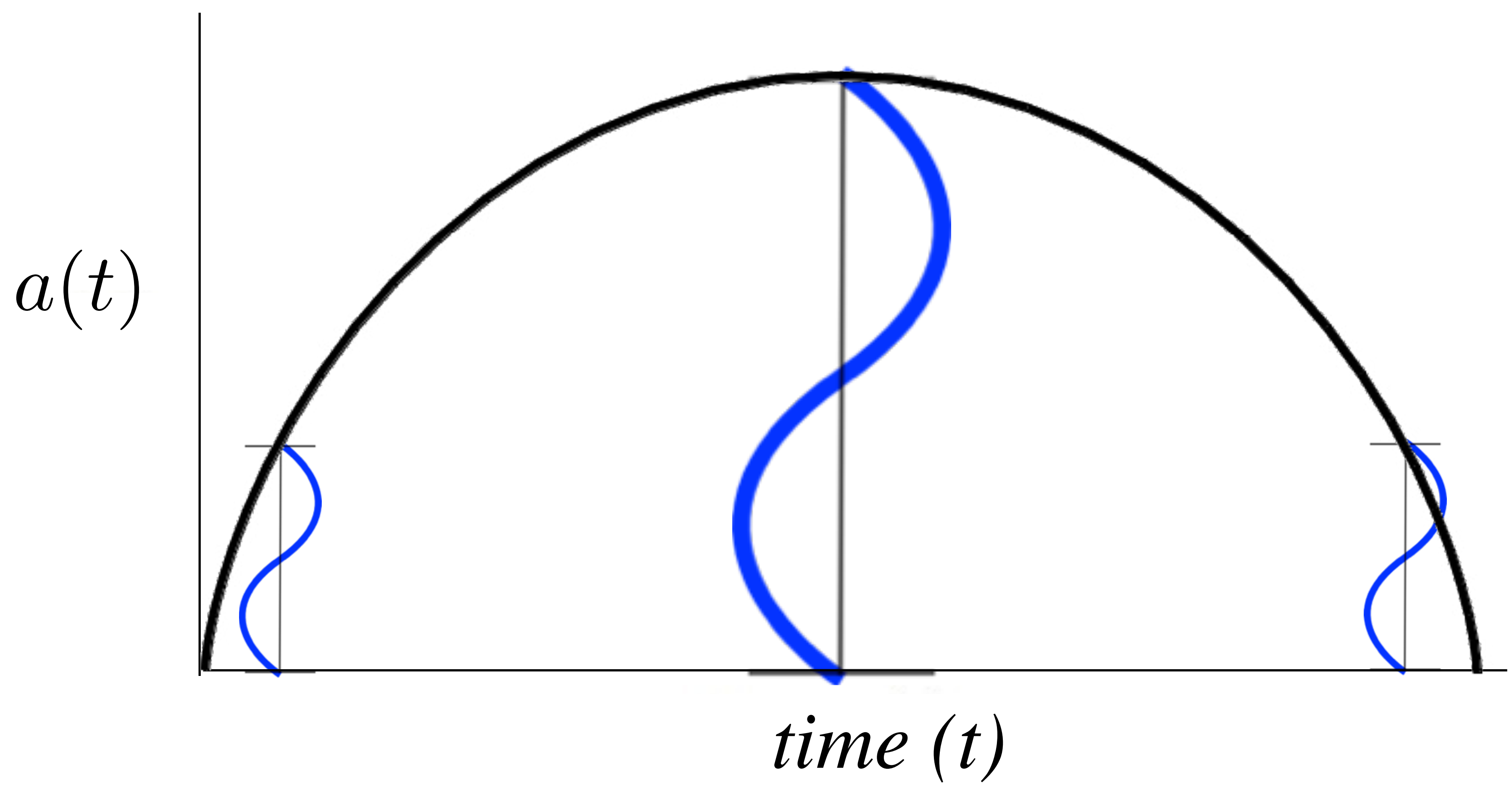


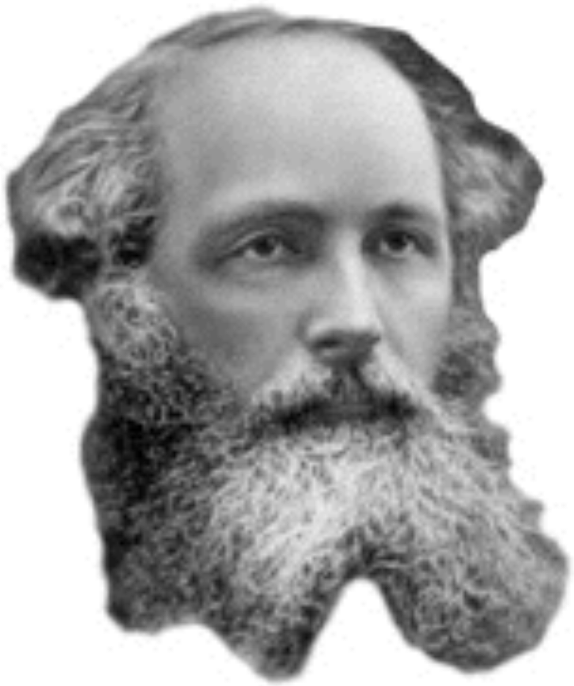


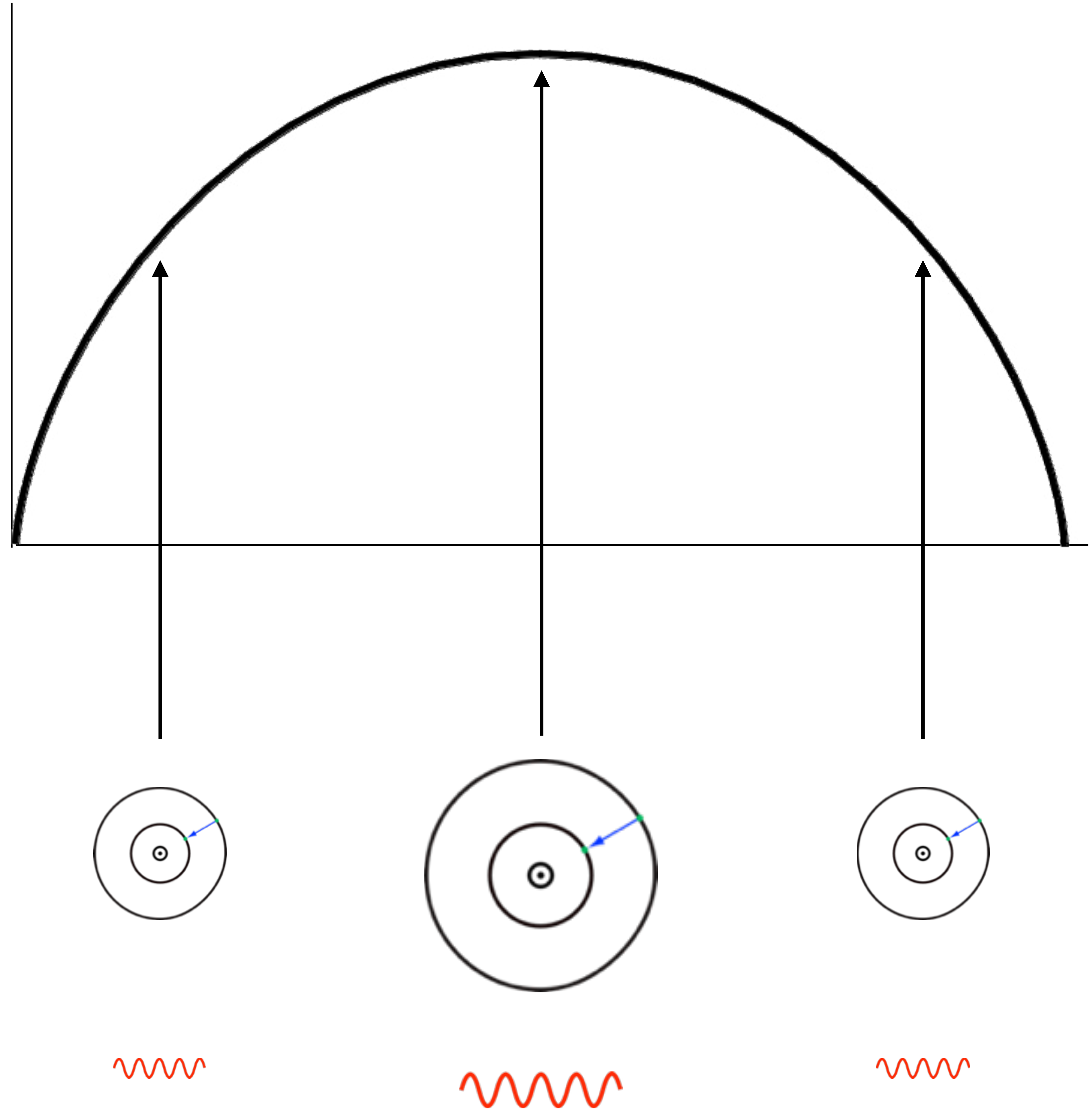
a(t)
t

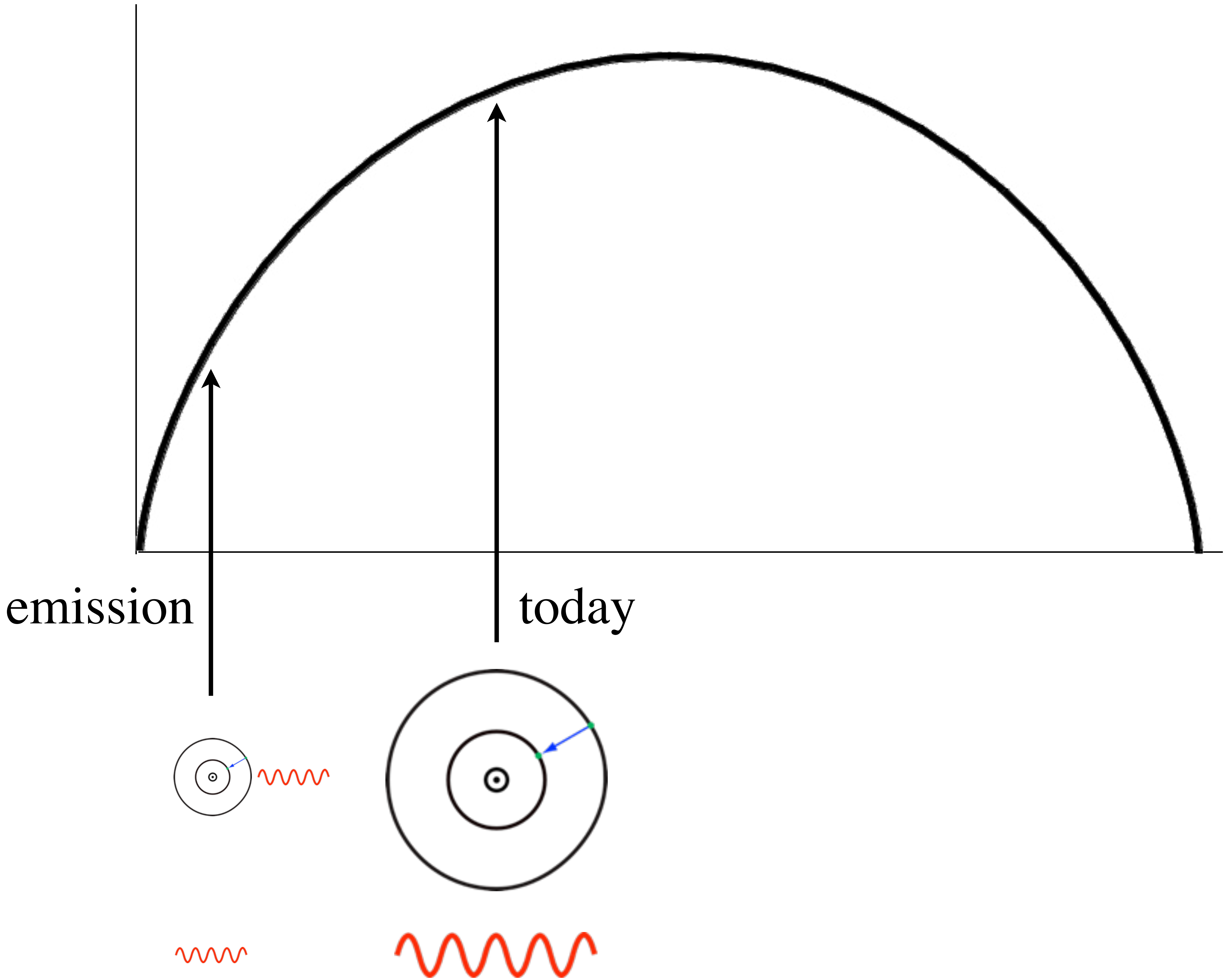
"In an expanding space all momenta decrease . . . This simple law has an even simpler interpretation in wave mechanics: all wavelengths, being inversely proportional to the momenta, simply expand with space."

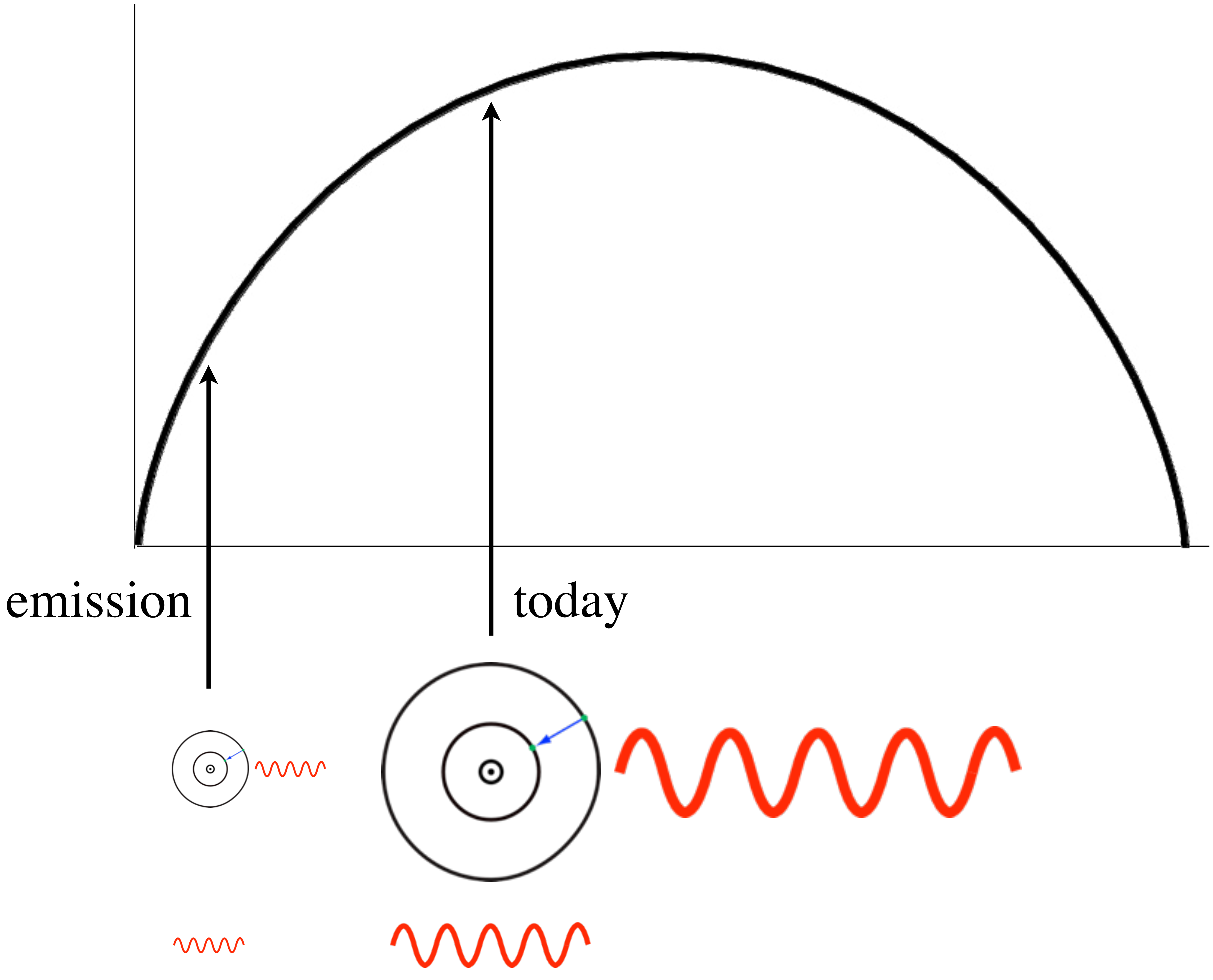
Erwin Schrödinger

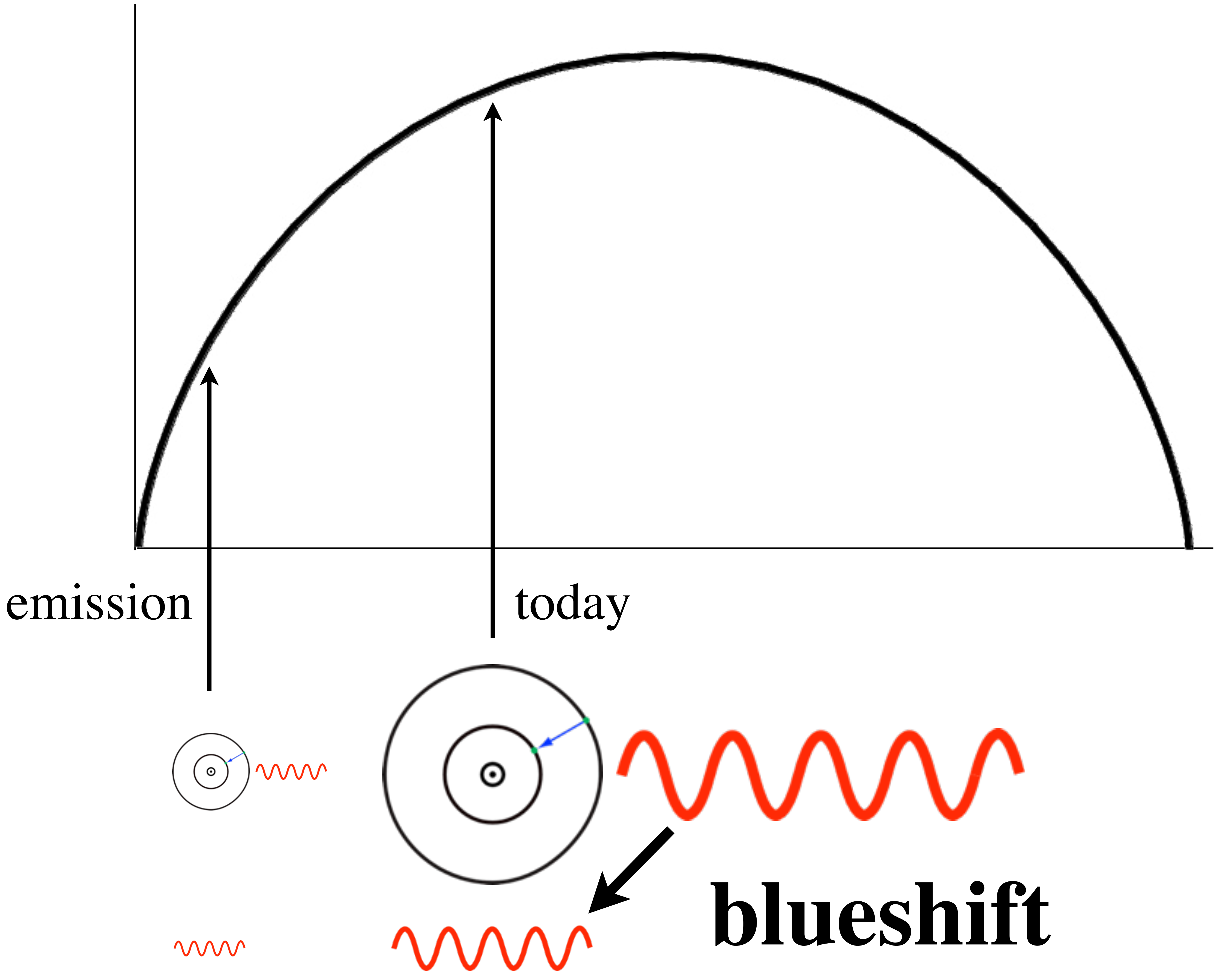


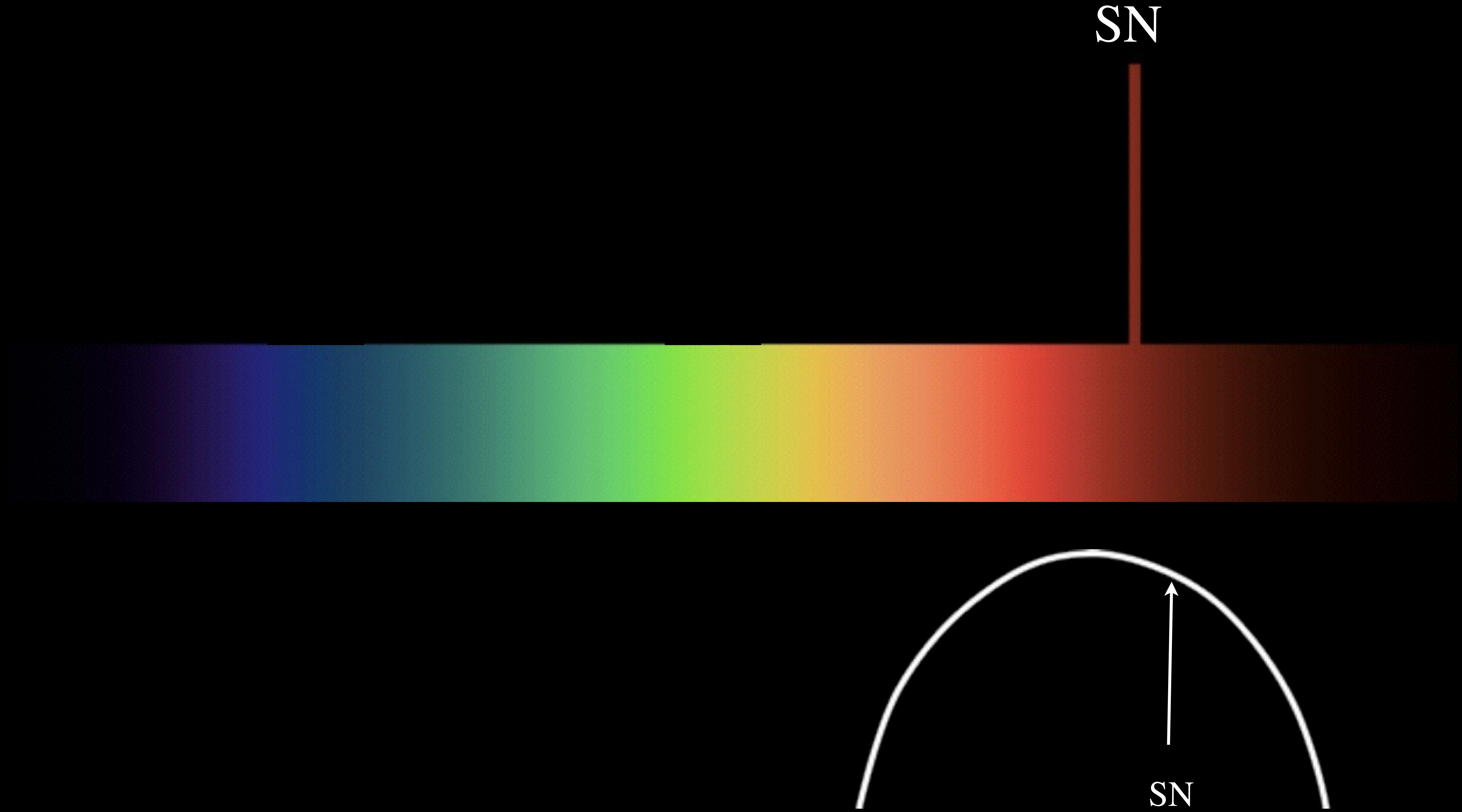


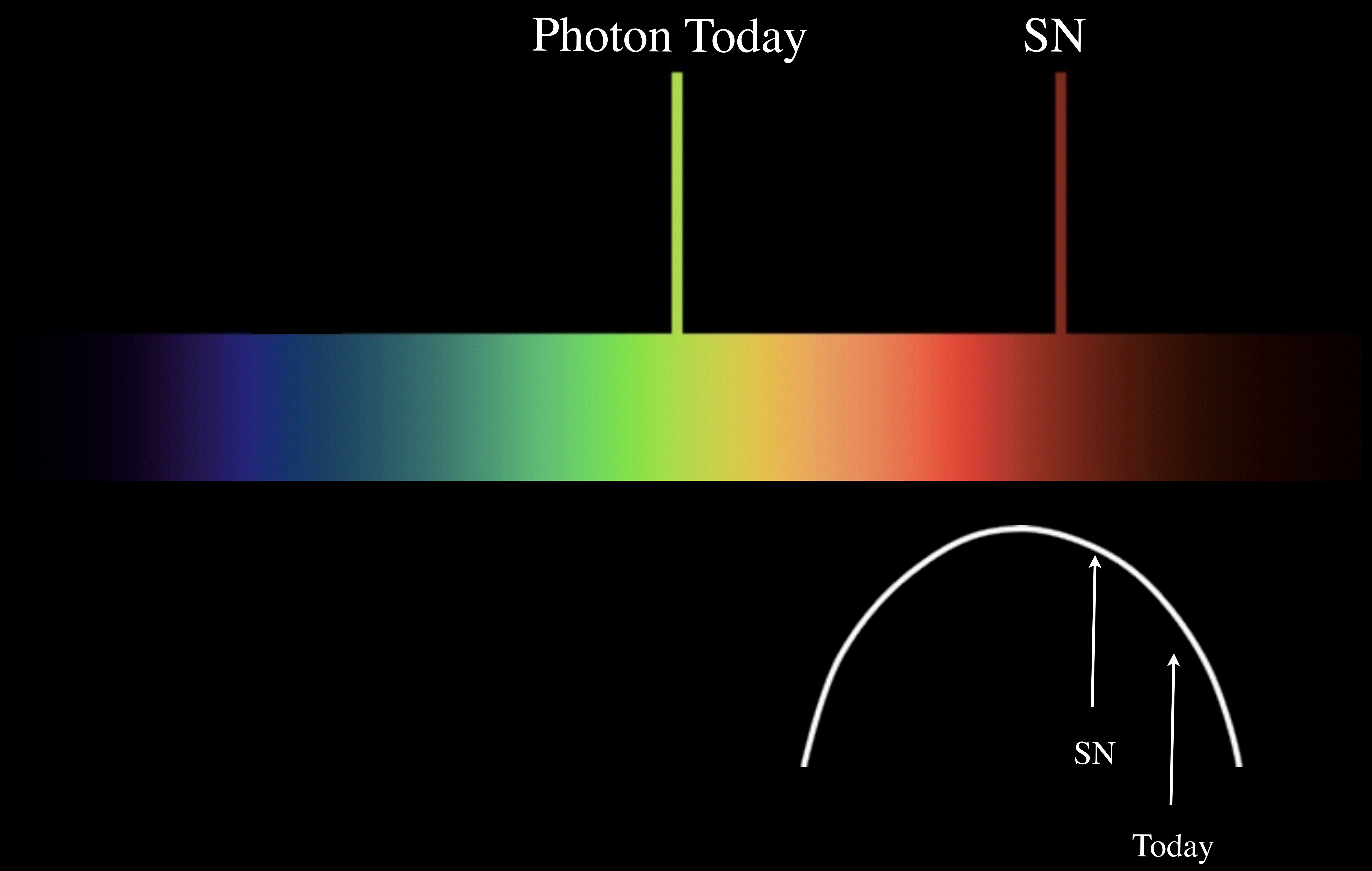


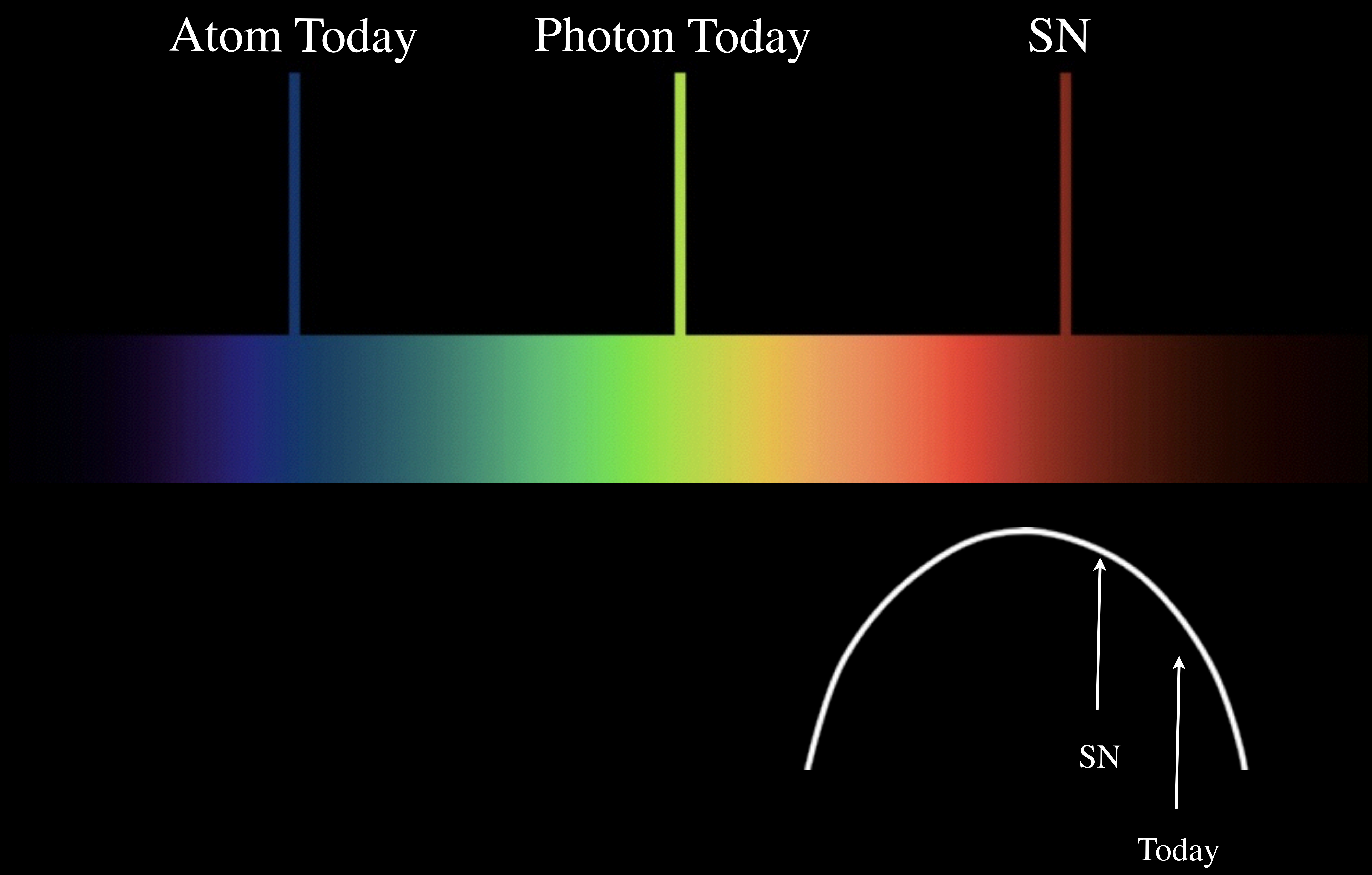

emission
today

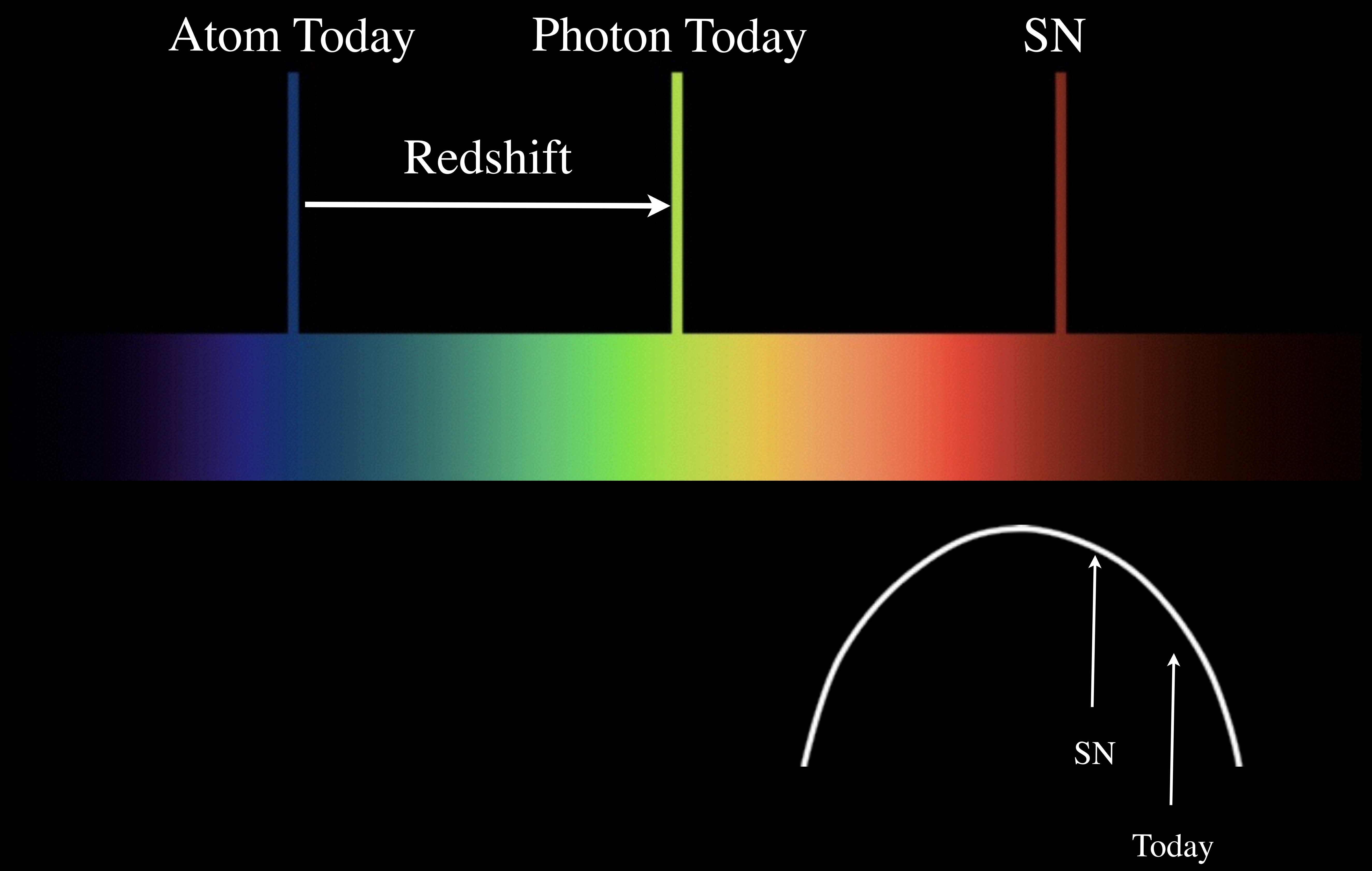

emission
today

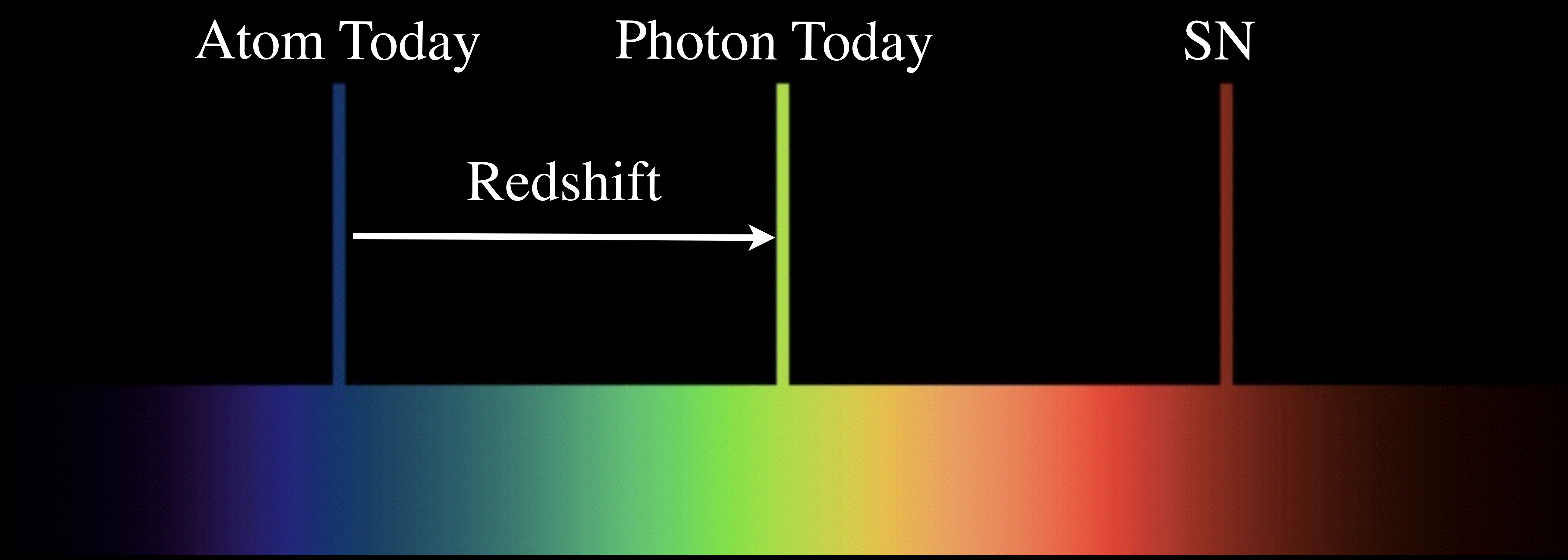

emission
today
blueshift


SN
SN

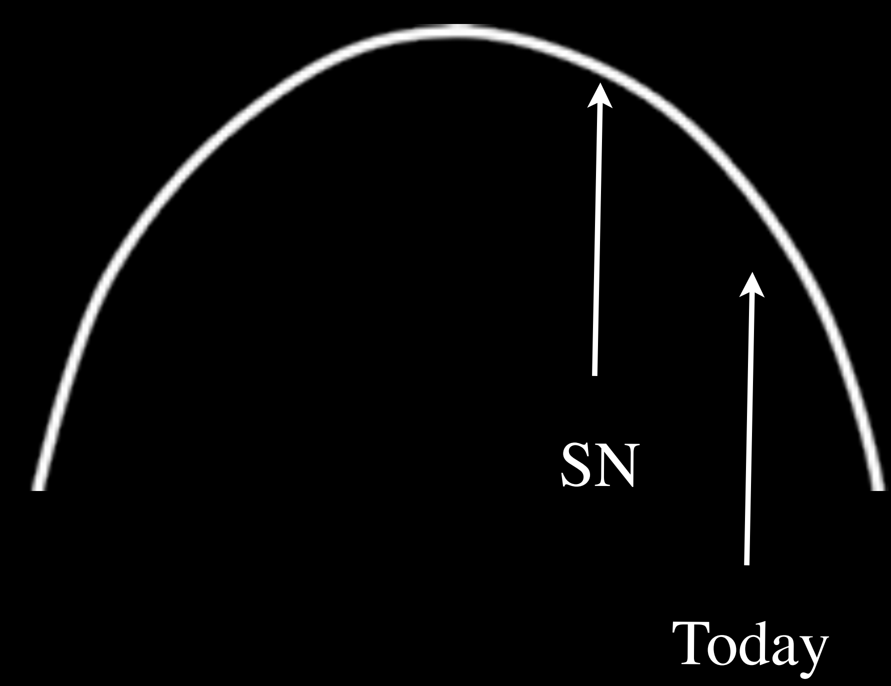

Photon Today
SN
SN
Today

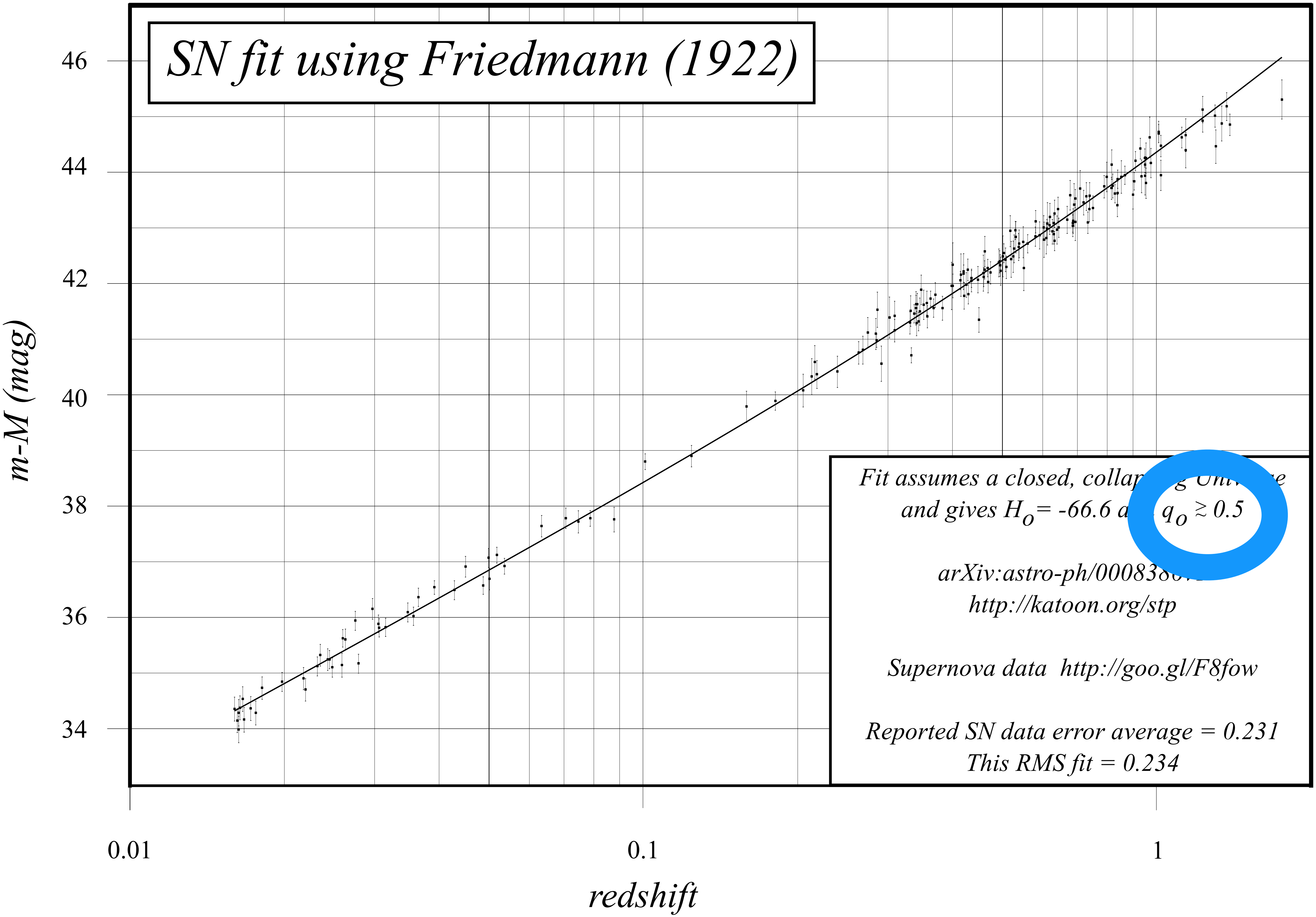

Atom Today
Photon Today
SN
SN
Today


Atom Today
Photon Today
SN
Redshift
SN
Today

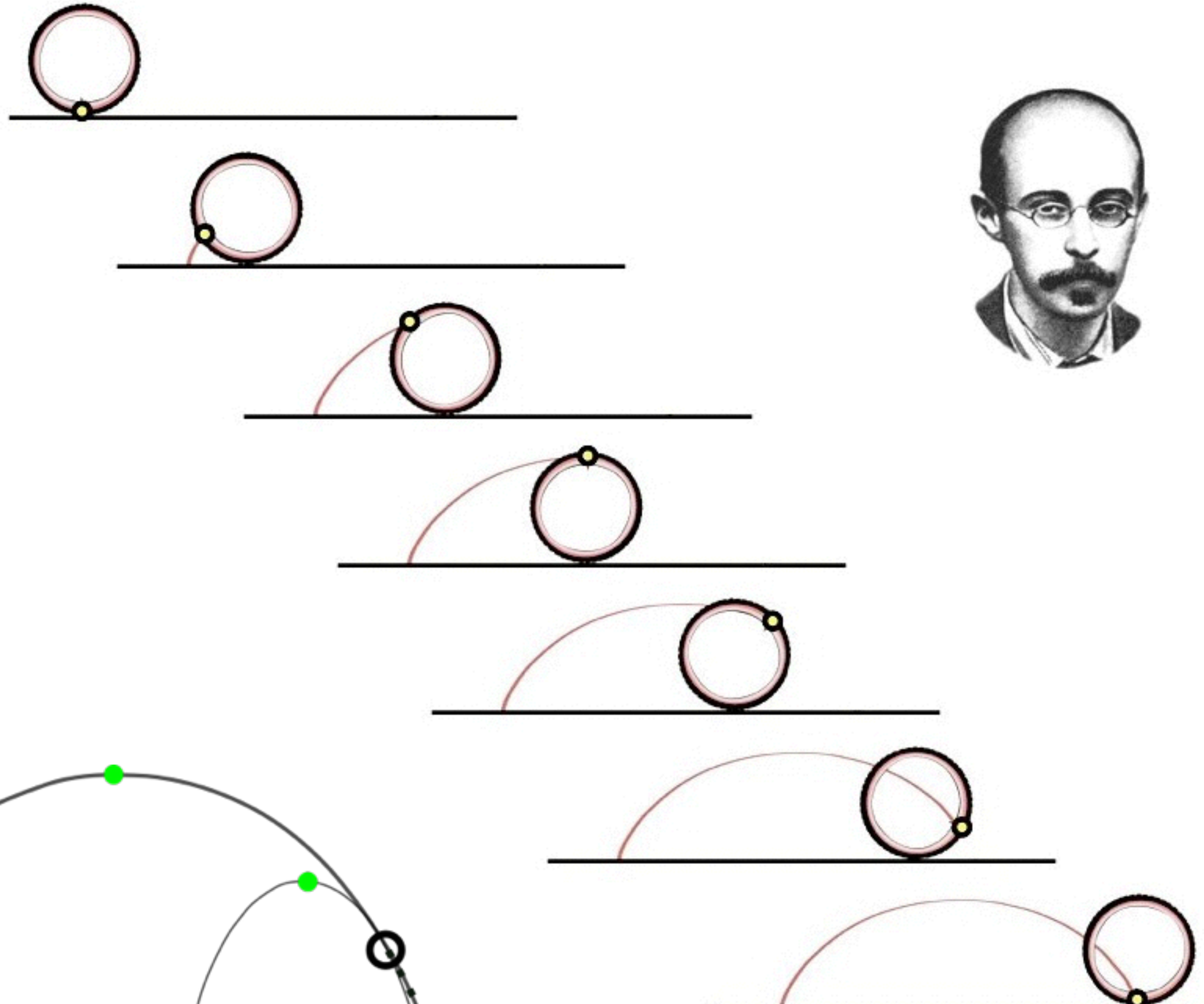


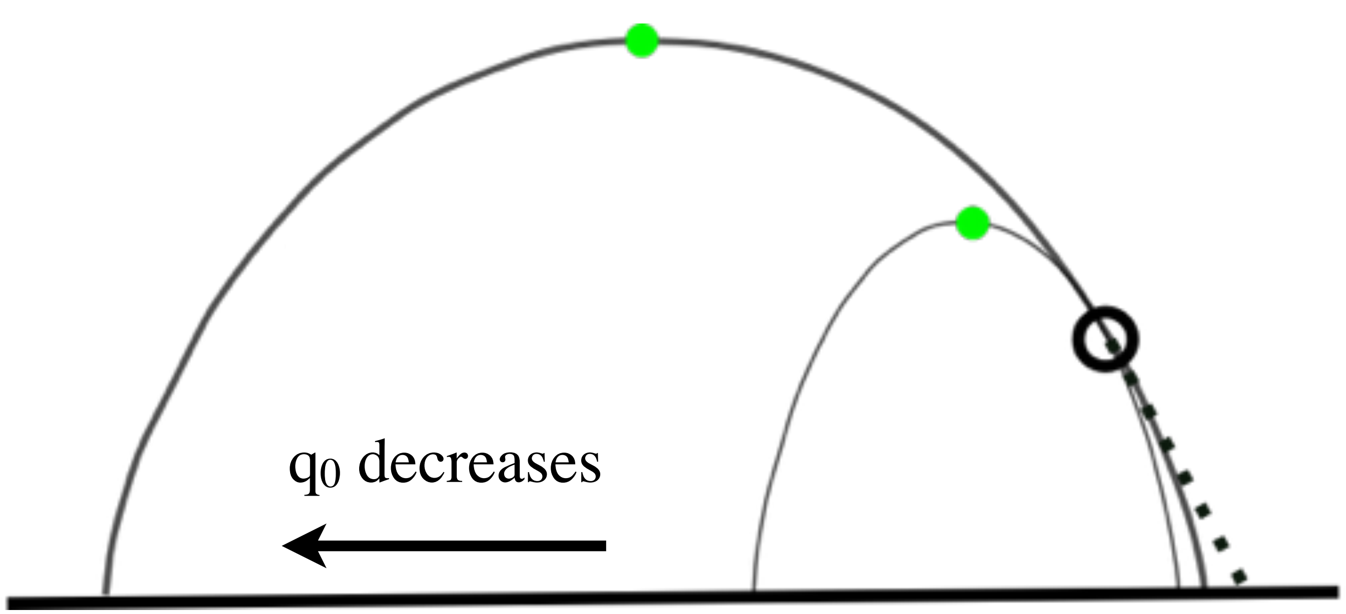
Redshift means collapse



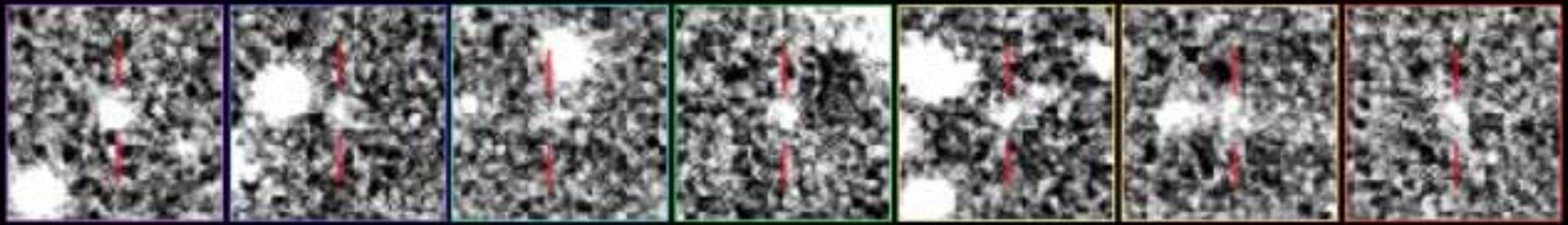


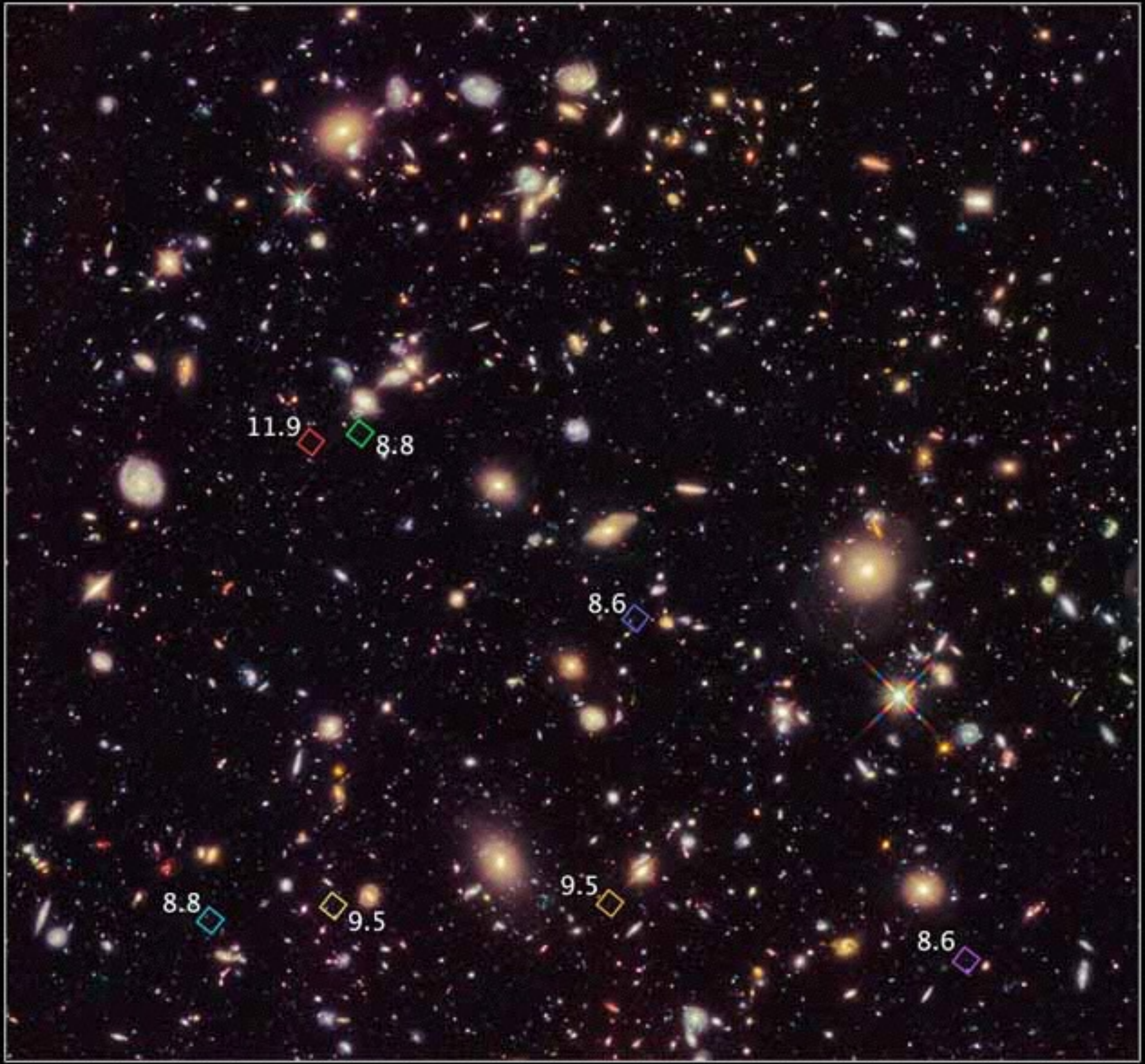
SN fit using Friedmann (1922)
46
44
42
40
38
36
34
m-M (mag)
0.01
0.1
1
redshift
Fit assumes a closed, collap
and gives H_o= -66.6 a
$q_o \gtrsim 0.5$
arXiv:astro-ph/000838
http://katoon.org/stp
Supernova data http://goo.gl/F8fow
Reported SN data error average = 0.231
This RMS fit = 0.234




q0 decreases

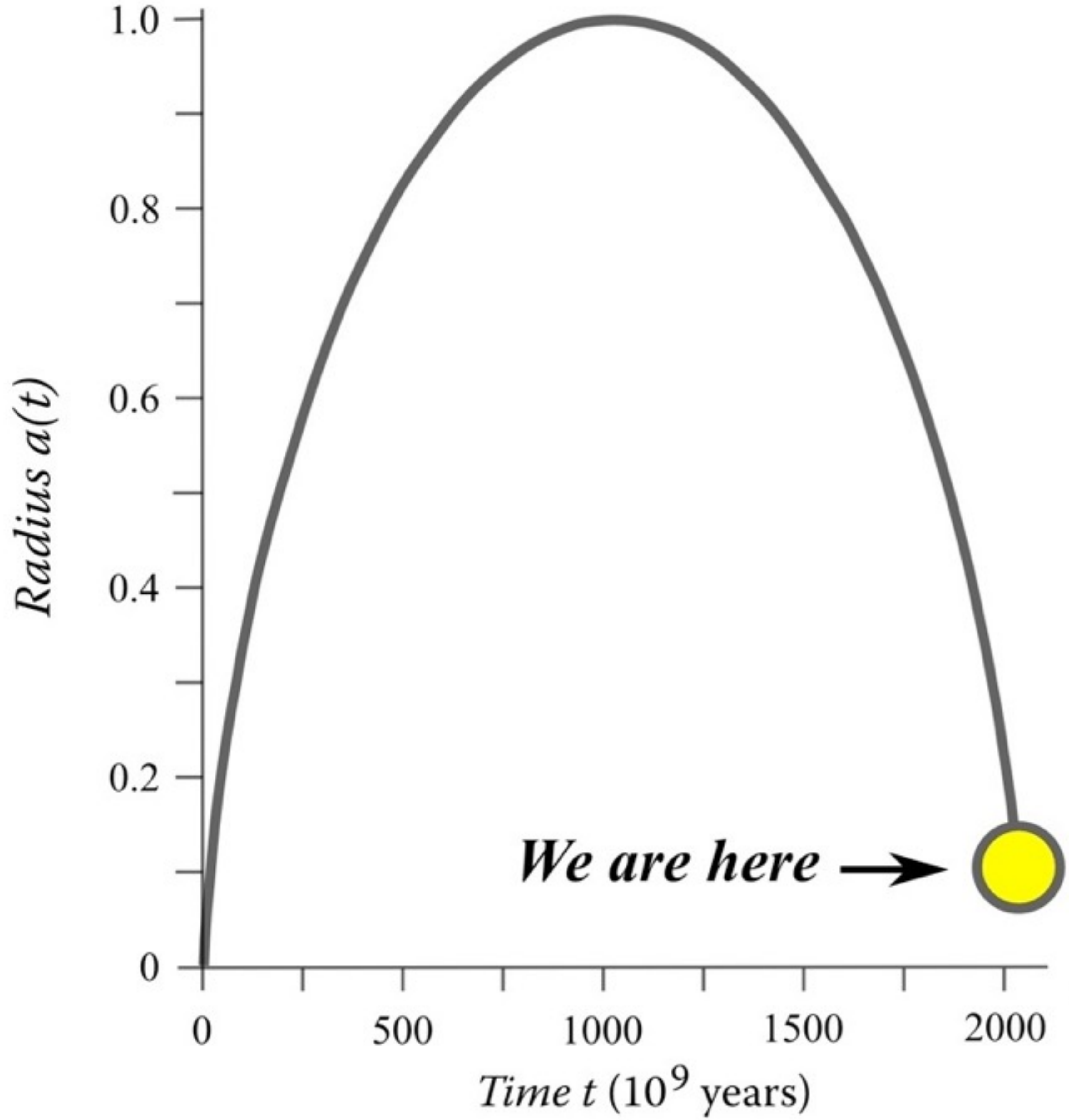
Hubble Ultra Deep Field 2012 *Hubble Space Telescope* WFC3/IR





NASA and ESA

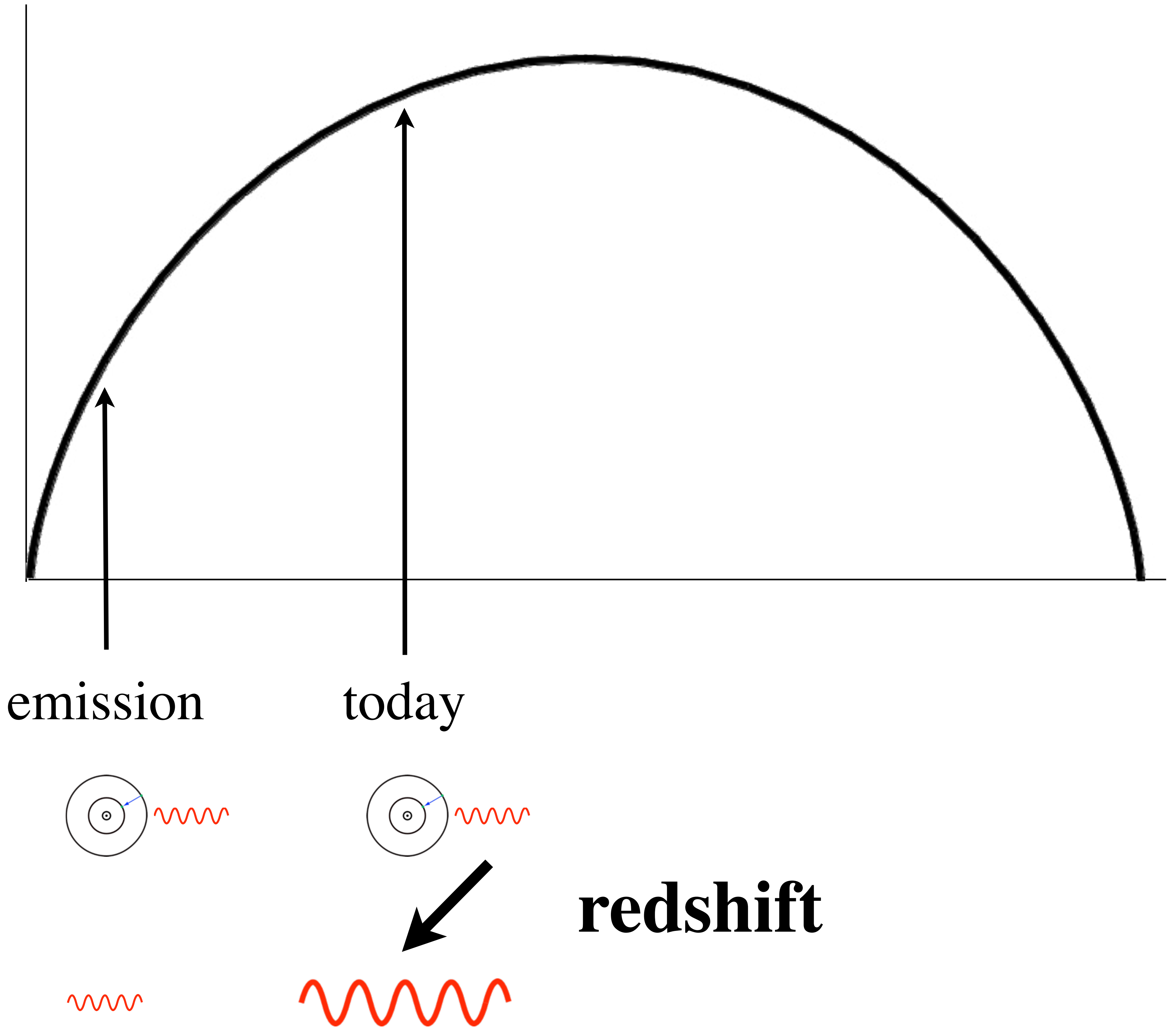
STScI-PRC12-48a



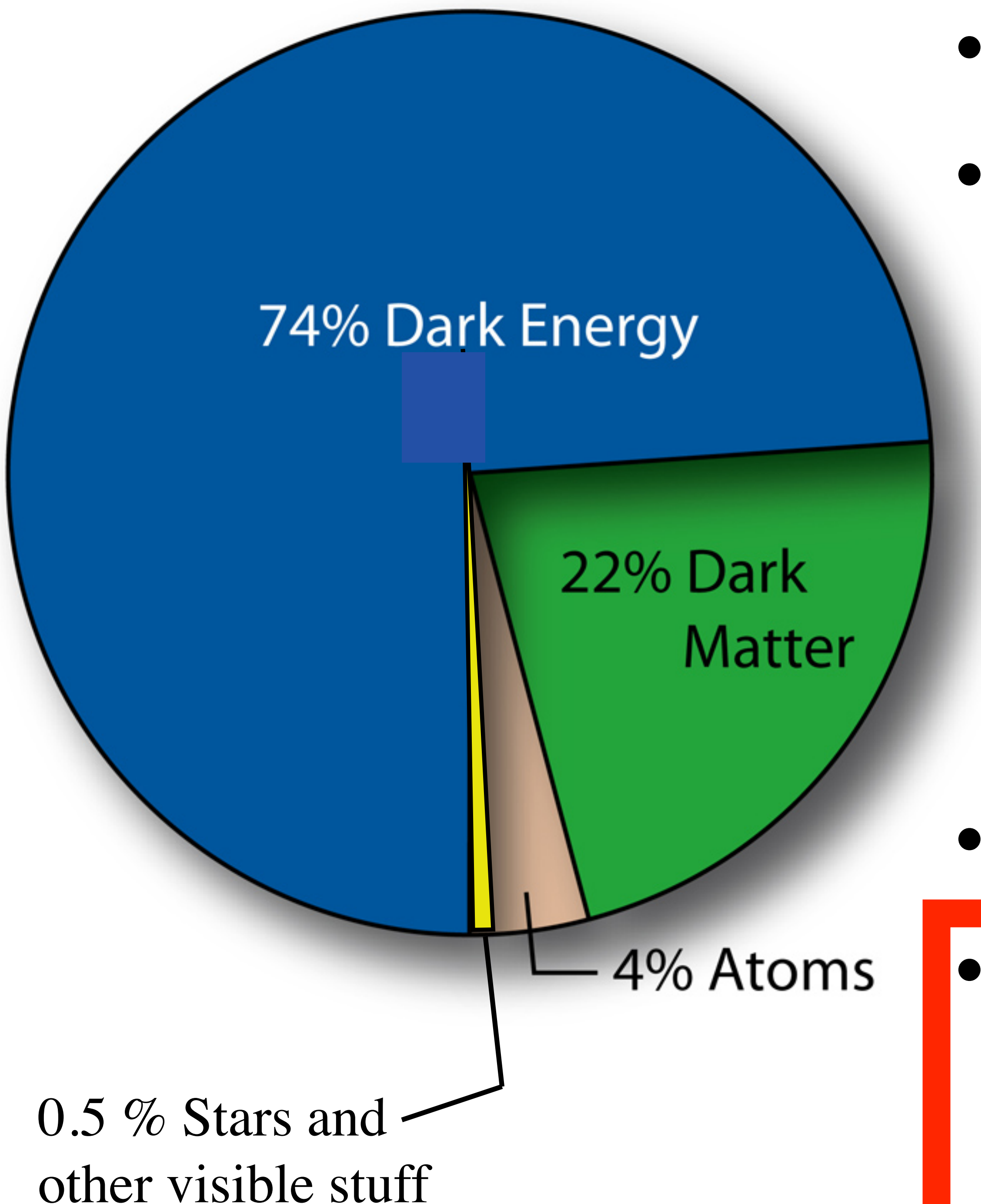
Time to collapse
~9.5 billion years

Which interpretation is “true” ?

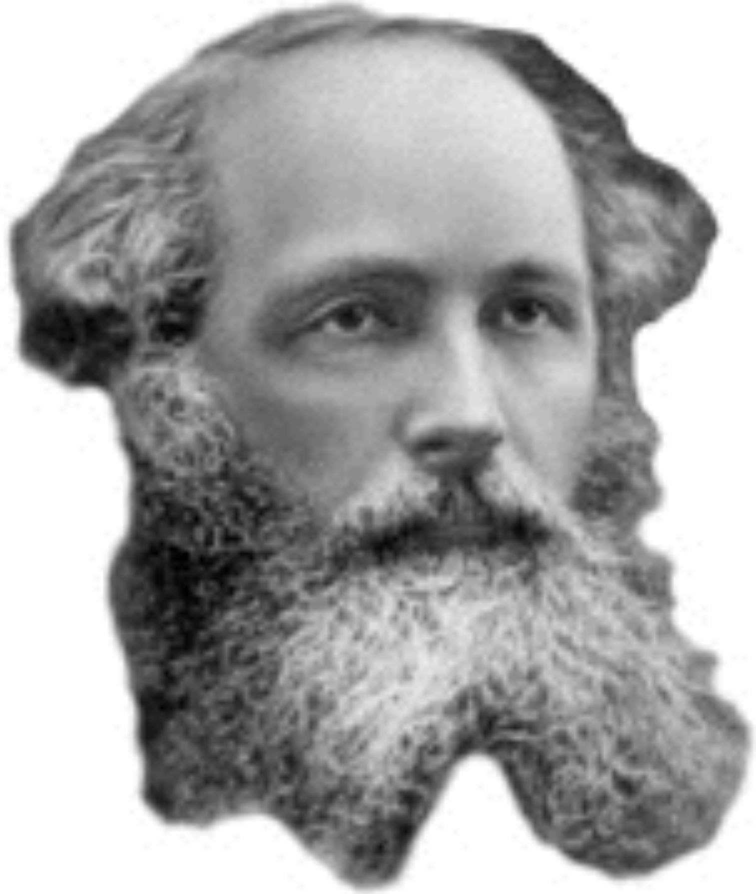
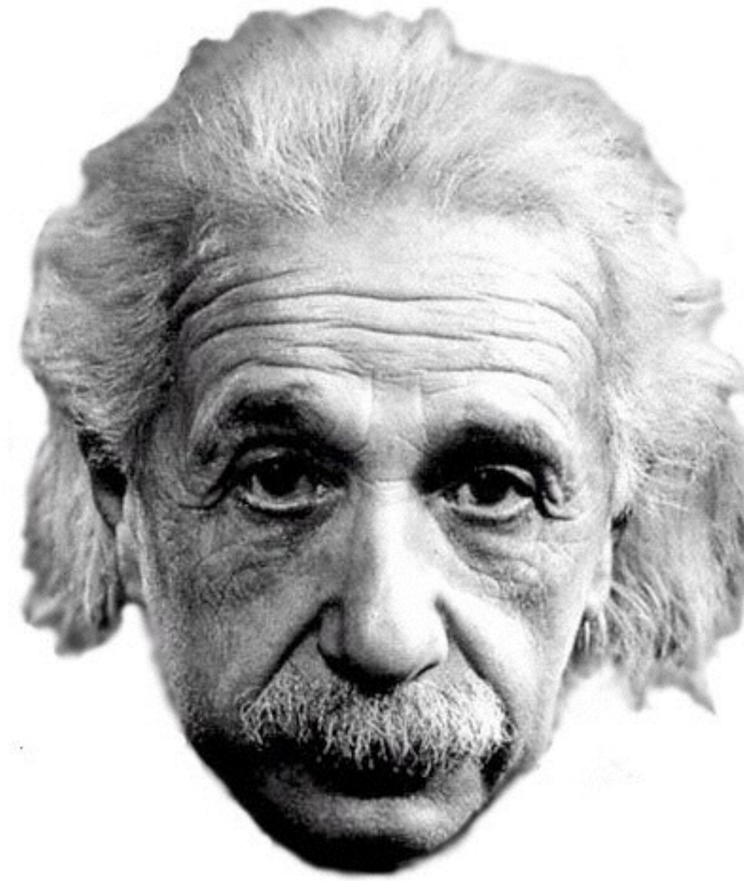
Ignoring: Is either interpretation “true” ?

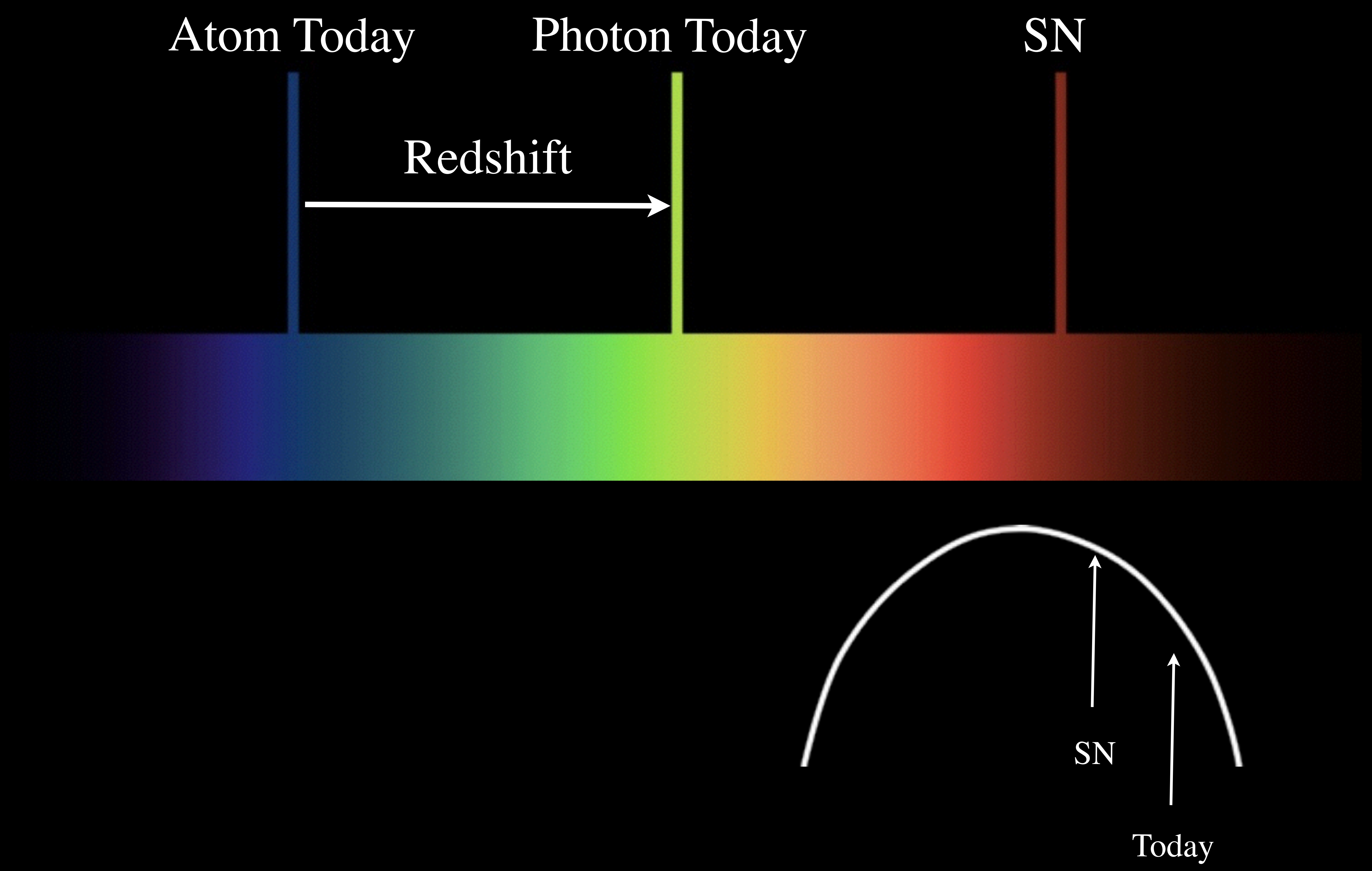

emission
today
redshift

Contents of the Universe: Summary

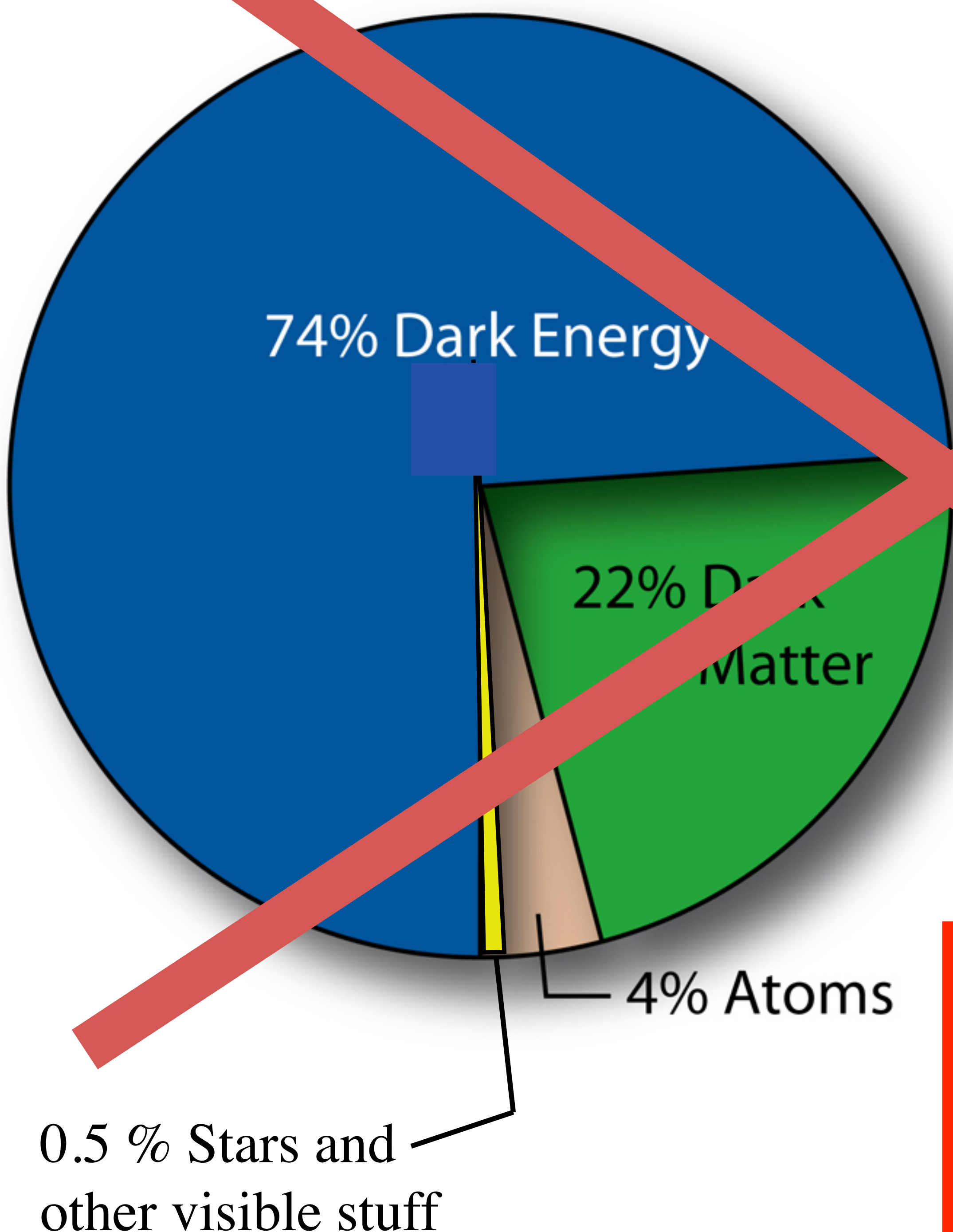


- $\Omega_0 = 1.00 \pm 0.02$
- $\Omega_m \approx 0.27 \pm 20\%$
  - $\Omega_b \approx 0.045 \pm 10\%$
    - Includes $\Omega_{visible} \approx 0.005$
  - $\Omega_{non\text{-}b} \approx 0.22$
    - Includes $\Omega_\nu < 0.005$
  - $\Omega_{CMBR} \approx 0.0001$
- $\Omega_{de} \approx 0.73 \pm 10\%$
- The physical nature of the DE is currently completely unknown

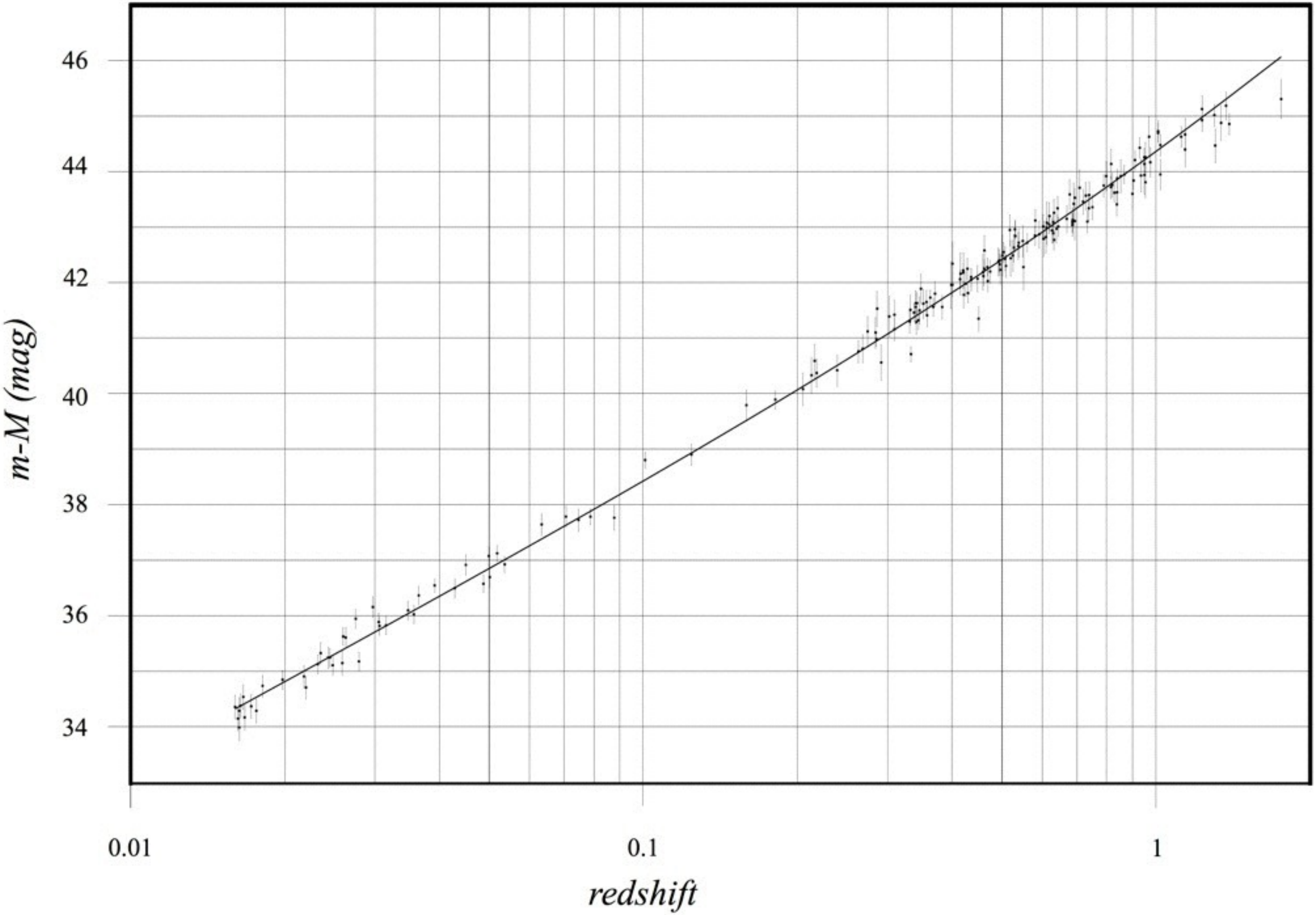

Atom Today
Photon Today
SN
Redshift
SN
Today

Contents of the Universe: Summary

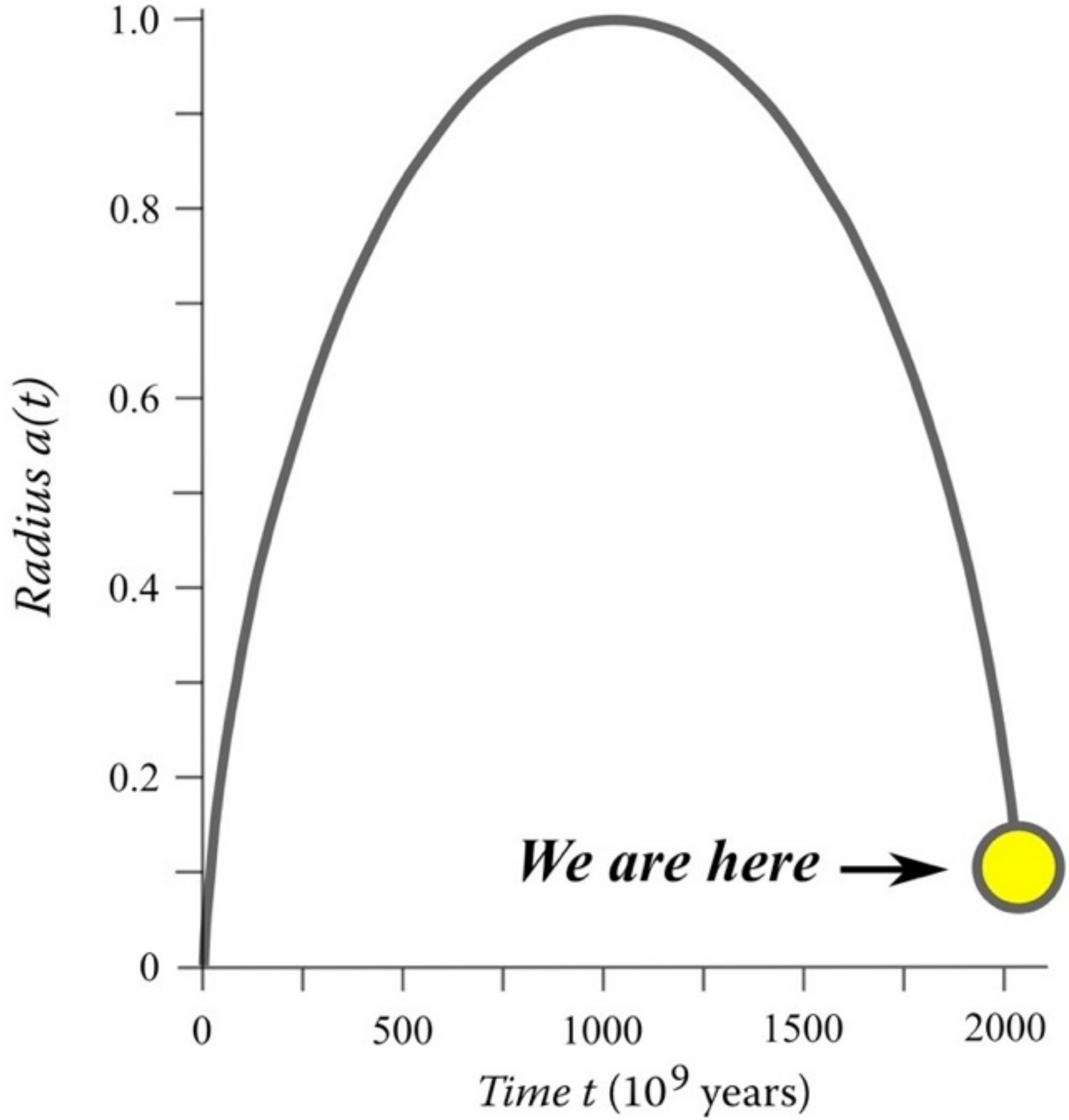


- $\Omega_0 = 1.00 \pm 0.0$[illegible]
- $\Omega_m \approx 0.27 \pm 20\%$
  - $\Omega_b \approx 0.045 \pm 10\%$
    - Includes $\Omega_{visible} \approx 0.005$
  - $\Omega_{non\text{-}b} \approx 0.22$
    - Includes $\Omega_\nu < 0.005$
  - $\Omega_{CMB} \approx 0.0001$
- $\Omega_{de} \approx 0.73 \pm 10\%$

- The physical nature of the DE is currently completely unknown



46
44
42
40
38
36
34
m-M (mag)
0.01
0.1
1
redshift



Time to collapse
~9.5 billion years

Nature

Physics

Mathematics

katoon.org

katoon.org/ehs/

HUBBLE REDSHIFT REVISITED

W. Q. SUMNER

Abstract. Vacuum permittivity is the scalar in Maxwell's equations that determines the speed of light and the strength of electrical fields. Einstein proved that vacuum permittivity changes with spacetime curvature. In a Friedmann universe, spacetime curvature changes with time, shifting both photons and atomic emissions. A photon today has a different wavelength than it did yesterday. Yesterday, an atom emitted a photon with a different wavelength than it emits today. To understand Hubble redshift in a Friedmann universe, both these changes must be taken into account. When they are, Hubble red- shift implies that the Friedmann universe is closed and collapsing. During collapse, both atomic emissions and photons blueshift. Atomic emissions blueshift about twice as much as photons do. Blueshifted photons seen in a telescope are redder than reference photons emitted today in the observatory. With this insight, supernovae redshift observations are beautifully fit simply using the physics of Maxwell, Einstein, Bohr, and Friedmann from the 1920's. There is no need to postulate dark energy. Supernovae redshift data imply that the universe is very nearly flat and will collapse in about 9.6 billion years. High-z redshift observations up to 11.9 suggest that the universe is at least 2000 billion years old. This is more than a hundred times greater than a typical star's lifetime. This makes it likely that most dark matter is the residue of stellar evolution.