

# PARAM SCIENCE MAGAZINE

YOCTO TO YOTTA  
A PHOTOGRAPHIC JOURNEY  
FROM THE  
INFINITE  
TO  
INFINITESIMAL

THINGS LARGER THAN THE SUN  
TO  
THINGS TINIER THAN ATOMS

Welcome to our May edition of the science magazine! It's a photo journey that shows you the universe ranging from the largest scale(that's what we call 'Yotta' , or  $10^{24}$ ) all the way down to the teeniest-tiniest scale(that's 'Yocto' , or  $10^{-24}$ ). To put it in context:-

- 1 Yotta second = 1,000,000,000,000,000,000,000,000 seconds
- 1 Trillion seconds = 1,000,000,000,000 seconds.

The next page is a glossary which will put the scale into perspective using the 7 main SI units.

## June Science Days

- 05 June : World Environment Day
- 07 June : World Food Safety Day
- 08 June : World Oceans Day
- 29 June : National Statistics Day
- 29 June : International Day of the Tropics
- 30 June : World Asteroid Day

## June Birthdays

- |                               |                |
|-------------------------------|----------------|
| Tim Berners-Lee               | : 08 June 1955 |
| John Forbes Nash Jr           | : 13 June 1928 |
| James Clerk Maxwell           | : 13 June 1831 |
| Maria Goeppert Mayer          | : 28 June 1906 |
| Prasanta C. Mahalanobis       | : 29 June 1893 |
| Chintamani N. Ramachandra Rao | : 30 June 1934 |

# YOTTA TO YOCTO

yotta(Y)	→ 1 000 000 000 000 000 000 000 000 000
zetta (Z)	→ 1 000 000 000 000 000 000 000 000
exa (E)	→ 1 000 000 000 000 000 000 000
peta (P)	→ 1 000 000 000 000 000 000
tera (T)	→ 1 000 000 000 000 000
giga (G)	→ 1 000 000 000
mega (M)	→ 1 000 000
kilo (k)	→ 1000
hecto(h)	→ 100
deca (da)	→ 10
deci (d)	→ 0.1
centi (c)	→ 0.01
milli (m)	→ 0.001
micro (μ)	→ 0.000 001
nano (n)	→ 0.000 000 001
pico (p)	→ 0.000 000 000 001
femto (f)	→ 0.000 000 000 000 001
atto (a)	→ 0.000 000 000 000 000 001
zepto (z)	→ 0.000 000 000 000 000 000 001
yocto (y)	→ 0.000 000 000 000 000 000 000 001

## SI UNITS

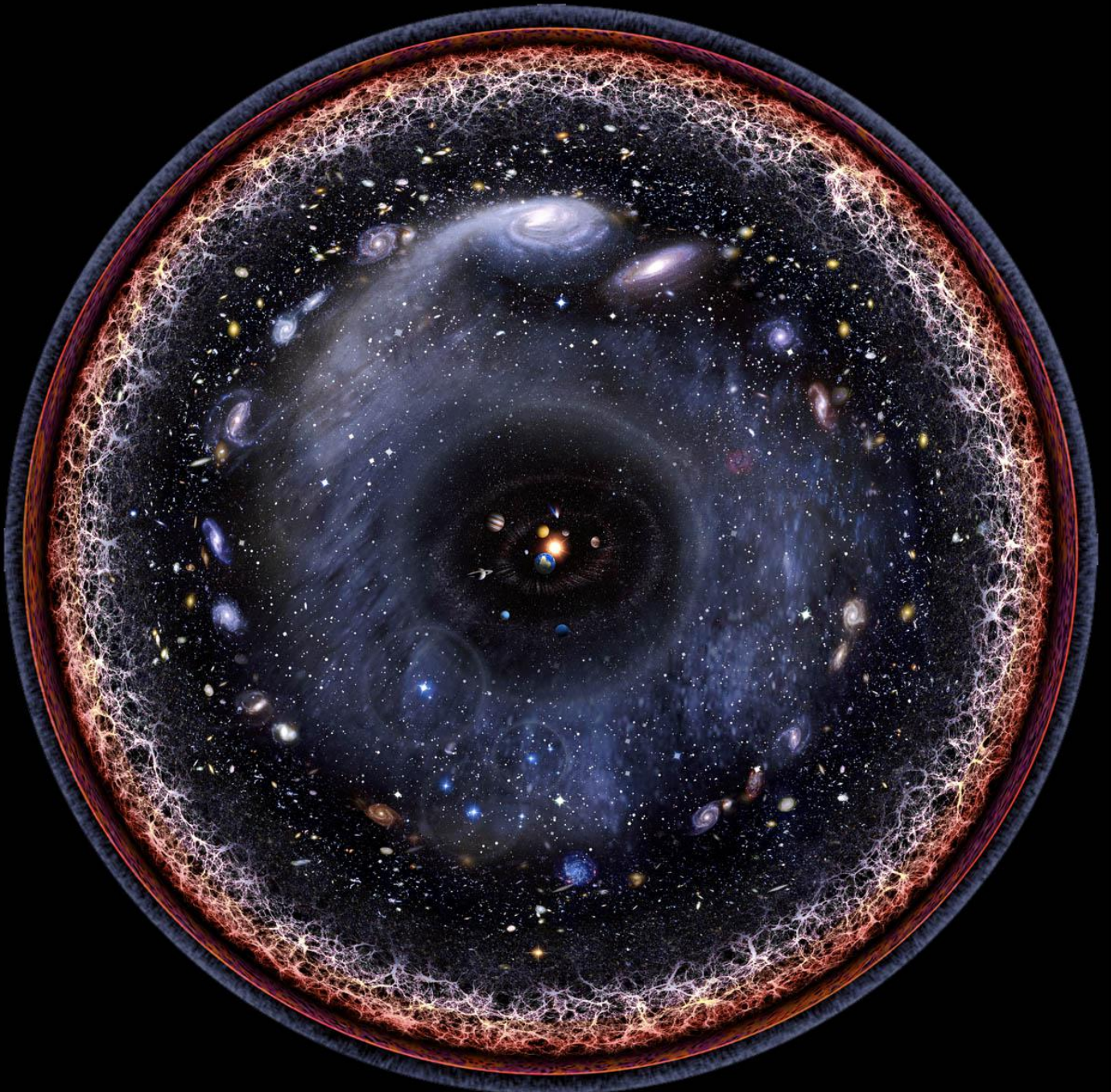
<b>Kilogram (kg)</b>	: Unit of mass.
<b>Candela (cd)</b>	: Unit of luminous intensity.
<b>Ampere (A)</b>	: Unit measuring electric current strength.
<b>Mole (mol)</b>	: Unit of amount of substance.
<b>Second (s)</b>	: Unit of time.
<b>Metre (m)</b>	: Unit of length.
<b>Kelvin (K)</b>	: Unit of measurement of temperature.

$(10)^{24}$

YOTTA(Y)

[METRE]

880 yottameter(Ym) is the diameter of the observable universe





$(10)^{21}$   
ZETTA(Z)  
[MOLE]

Approximately 0.36  
zettamoles(Zmol) of oxygen is  
present in earth's atmosphere

$(10)^{18}$

EXA(E)

[SECOND]

The universe is approximately  
0.4 exaseconds(Es) old  
(13.8 billion years)





$(10)^{15}$   
PETA(P)  
[SECOND]

Dinosaurs became extinct  
2 petaseconds(Ps)  
(66 million years) ago

$(10)^{12}$

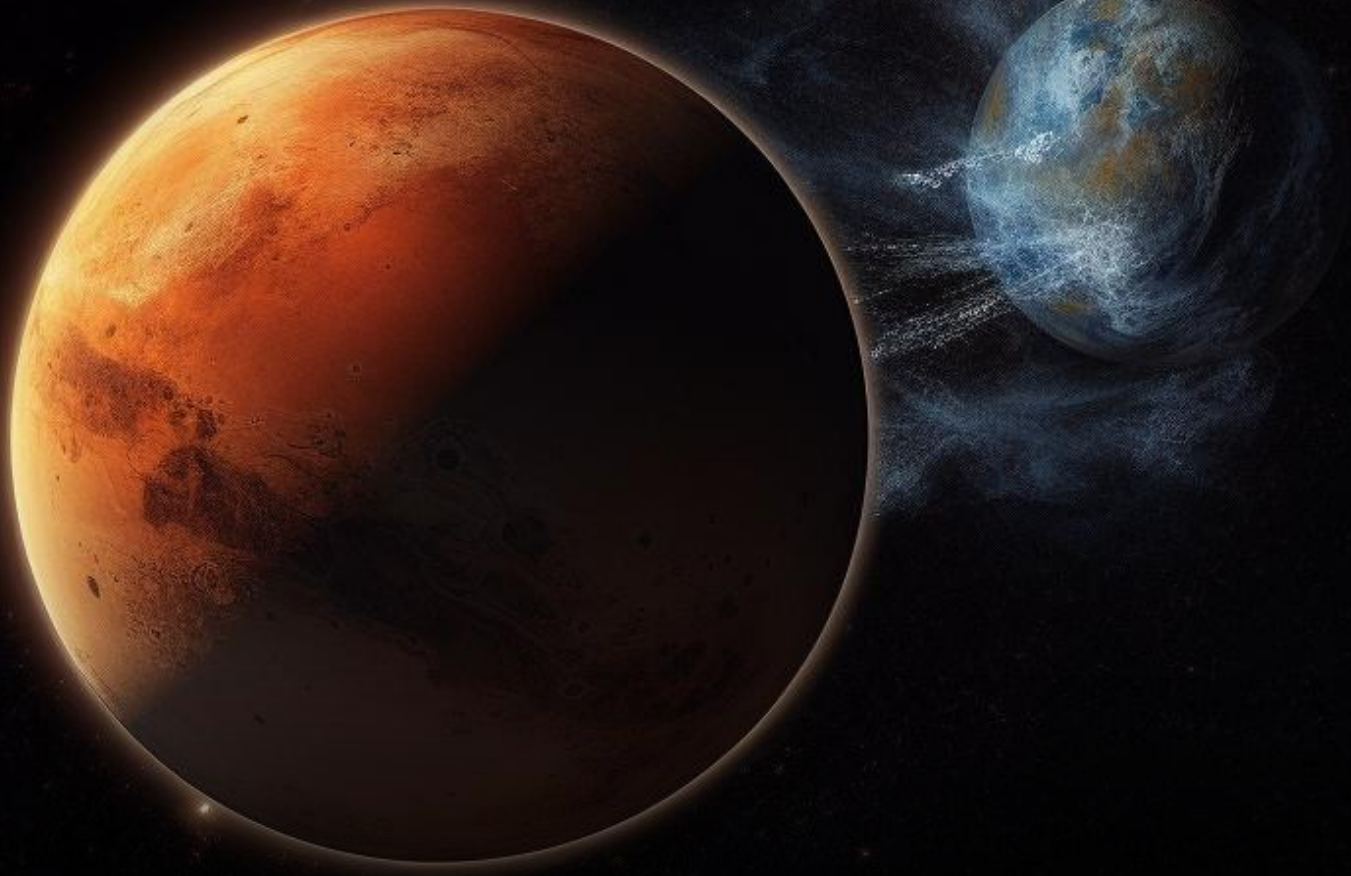
TERA(T)

[KILOGRAM]

First discovered Earth-crossing  
asteroid, Apollo 1862 weighs  
approximately  
2 terakilograms(Tkg)







**(10)<sup>9</sup>**  
**GIGA(G)**  
**[METRE]**

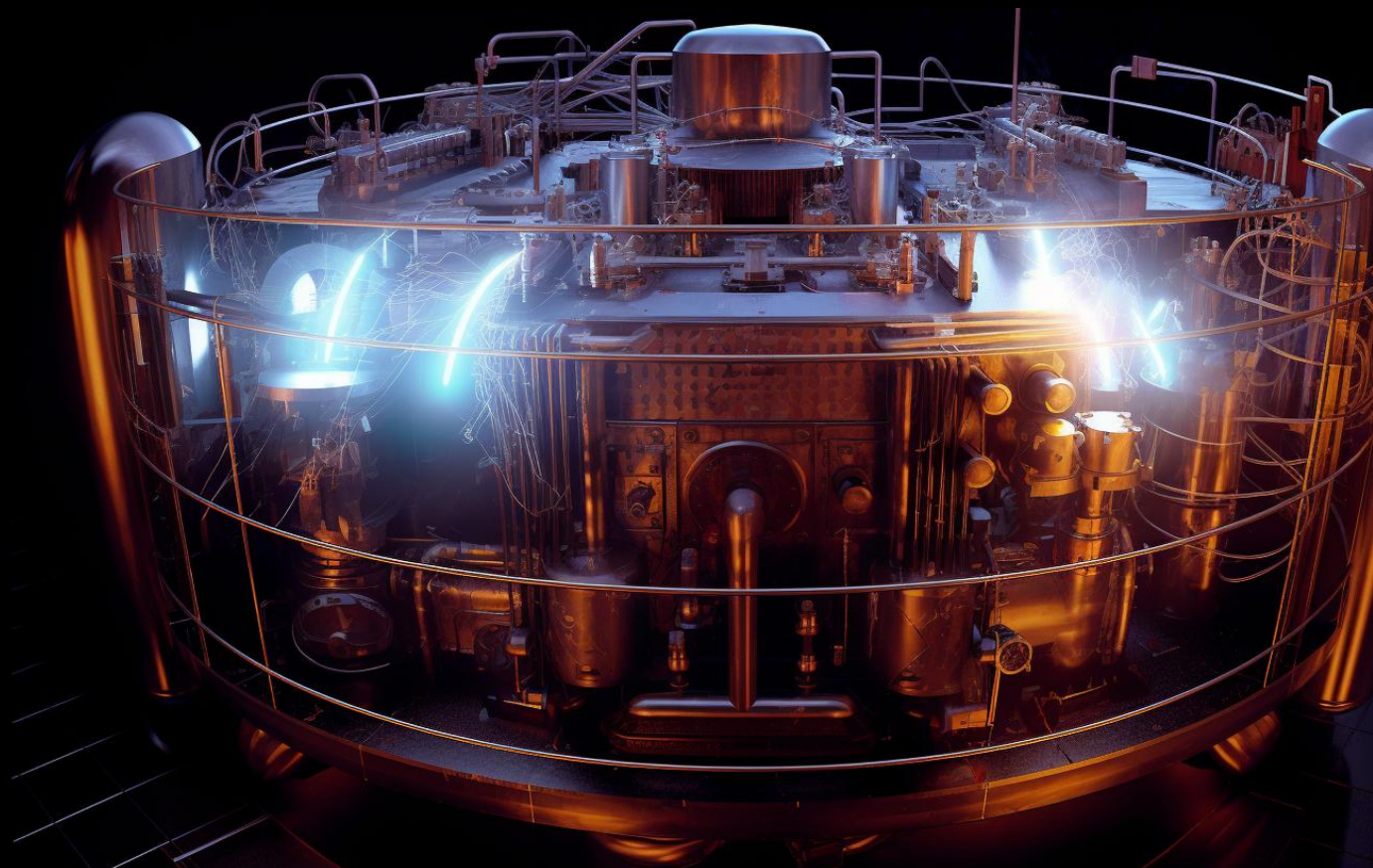
**The minimum distance from Earth  
to Mars is 0.054 gigameter(Gm)**

$(10)^6$

MEGA(M)

[AMPERE]

Nuclear fusion experiments use approximately 20 mega ampere (MA) of current





$(10)^3$   
KILO(k)  
[AMPERE]

A single lightning bolt carries  
30 kilo ampere(kA) of current

$(10)^2$

HECTO(h)

[KELVIN]

The temperature of a microwave oven is approximately 4 hectokelvin(hK)





**(10)<sup>1</sup>**

DECA(da)

[KELVIN]

The average temperature of the  
human body is  
31 deca kelvin(daK)

$(10)^{-1}$

DECI(d)

[AMPERE]

Electric eel fishes produce approximately 8 deciampere(dA) of current





$(10)^{-2}$   
CENTI(C)  
[CANDELA]

Bio Luminescent mushrooms have  
a luminous intensity of  
approximately  
1 centicandela(ccd)

$(10)^{-3}$

MILLI(m)

[MOLE]

A drop of water has  
2.7 millimoles(mmol) of water  
molecules







$(10)^{-6}$   
MICRO( $\mu$ )  
[METRE]

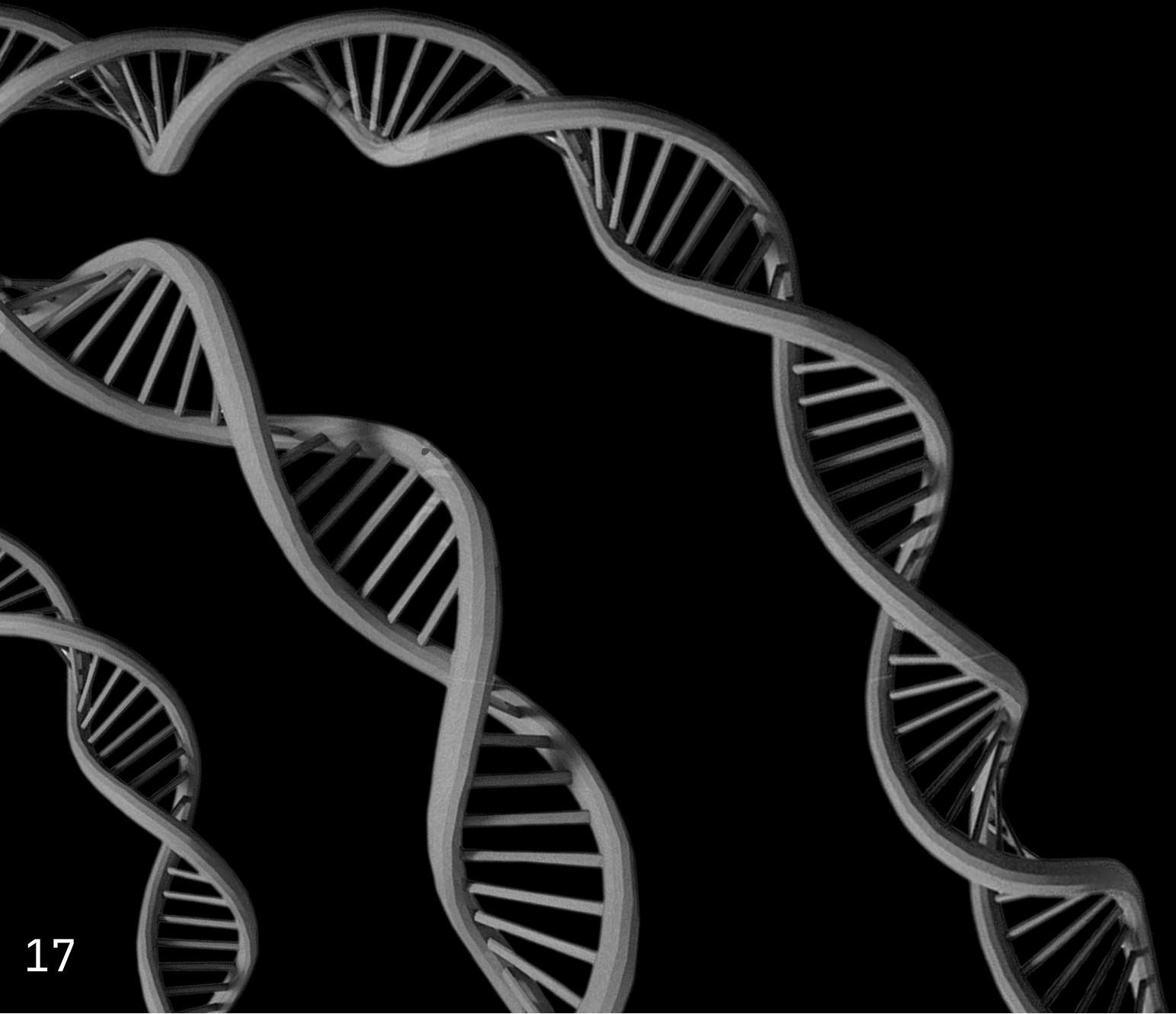
The size of a pollen grain is  
approximately  
30-40 micrometer( $\mu$  m)

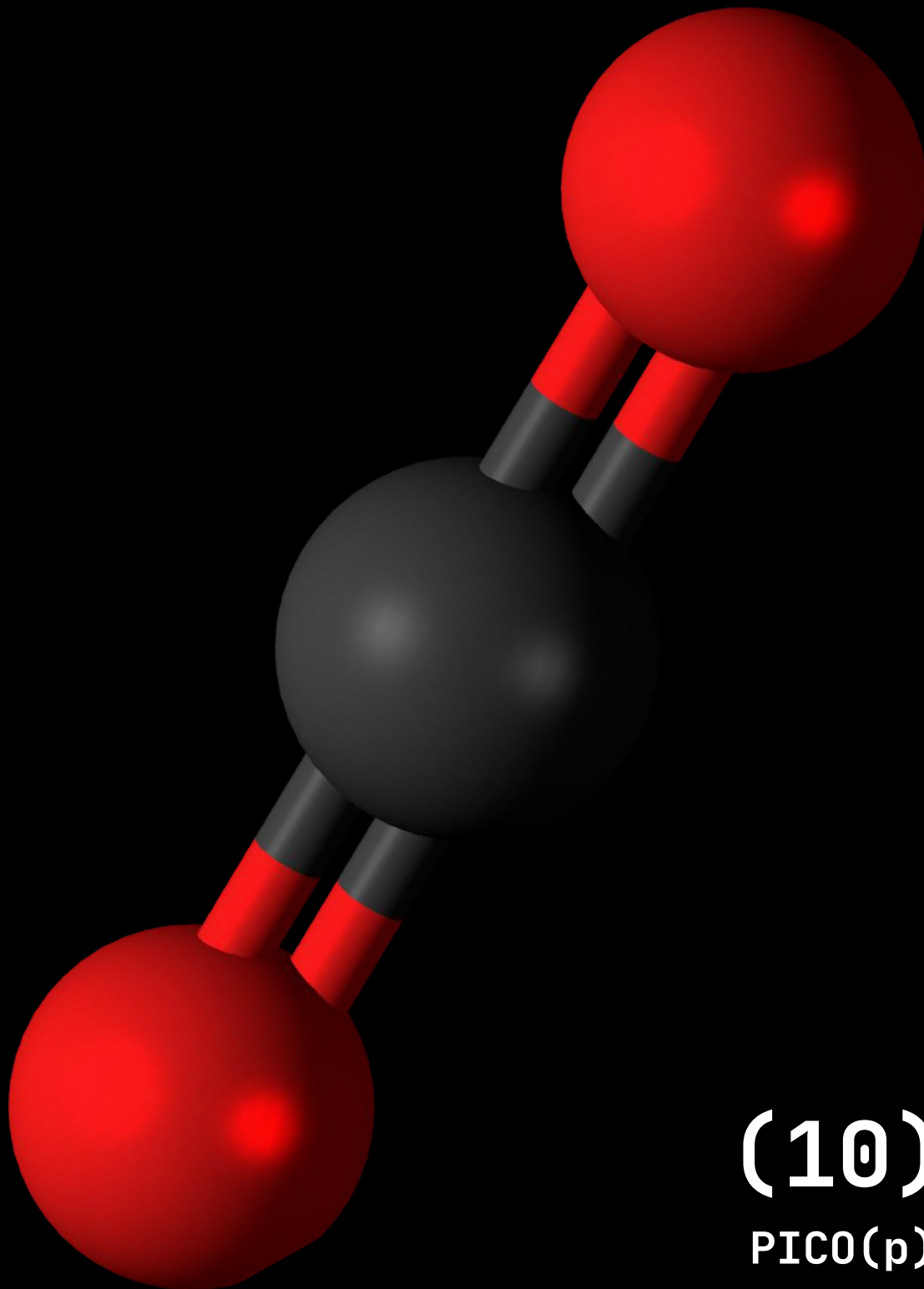
$(10)^{-9}$

NANO(n)

[METRE]

2 nanometer(nm) is the width of  
DNA double helix





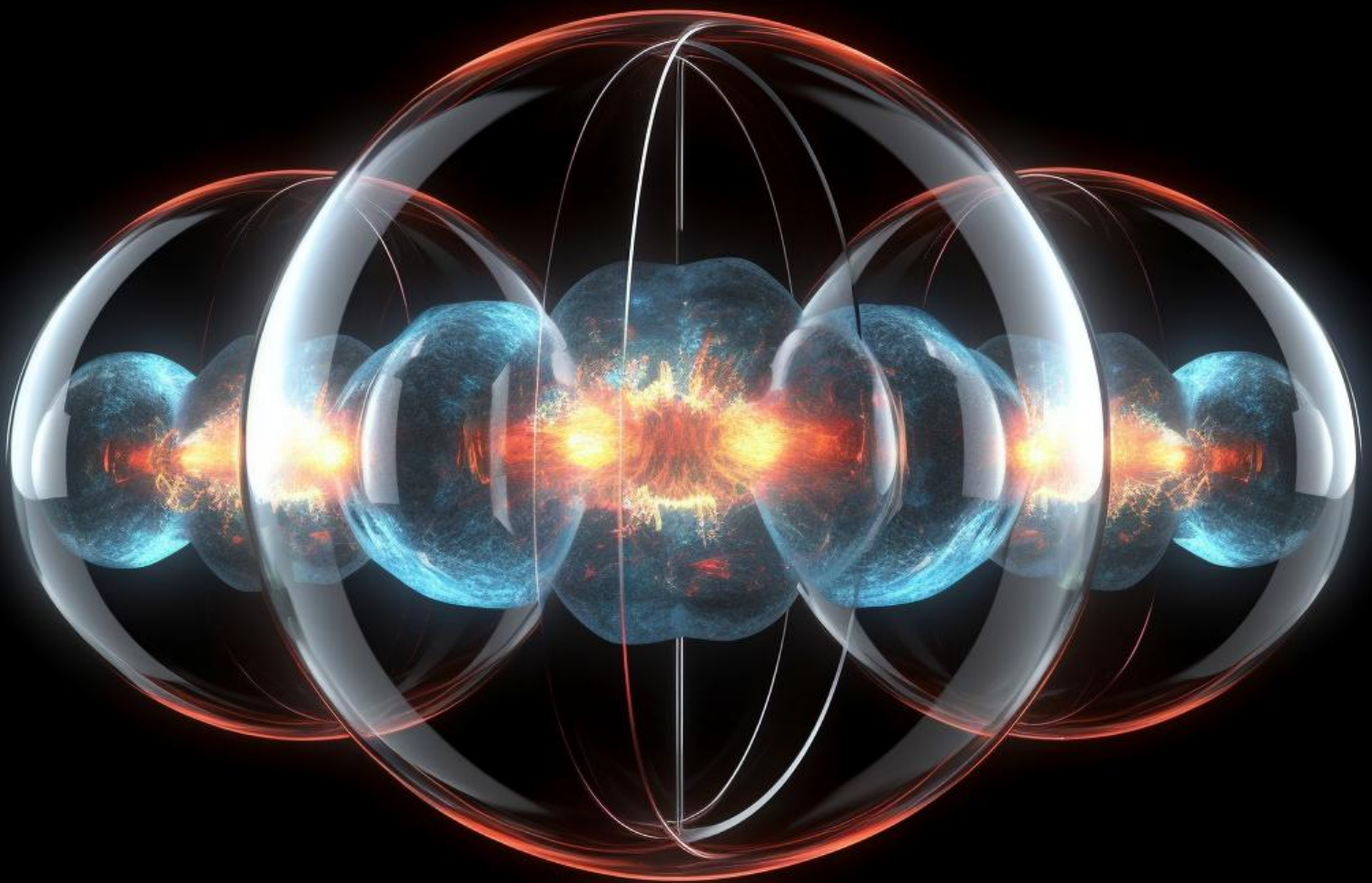
Carbon-oxygen bond length in a molecule of carbon dioxide is 116.3 picometer(pm)

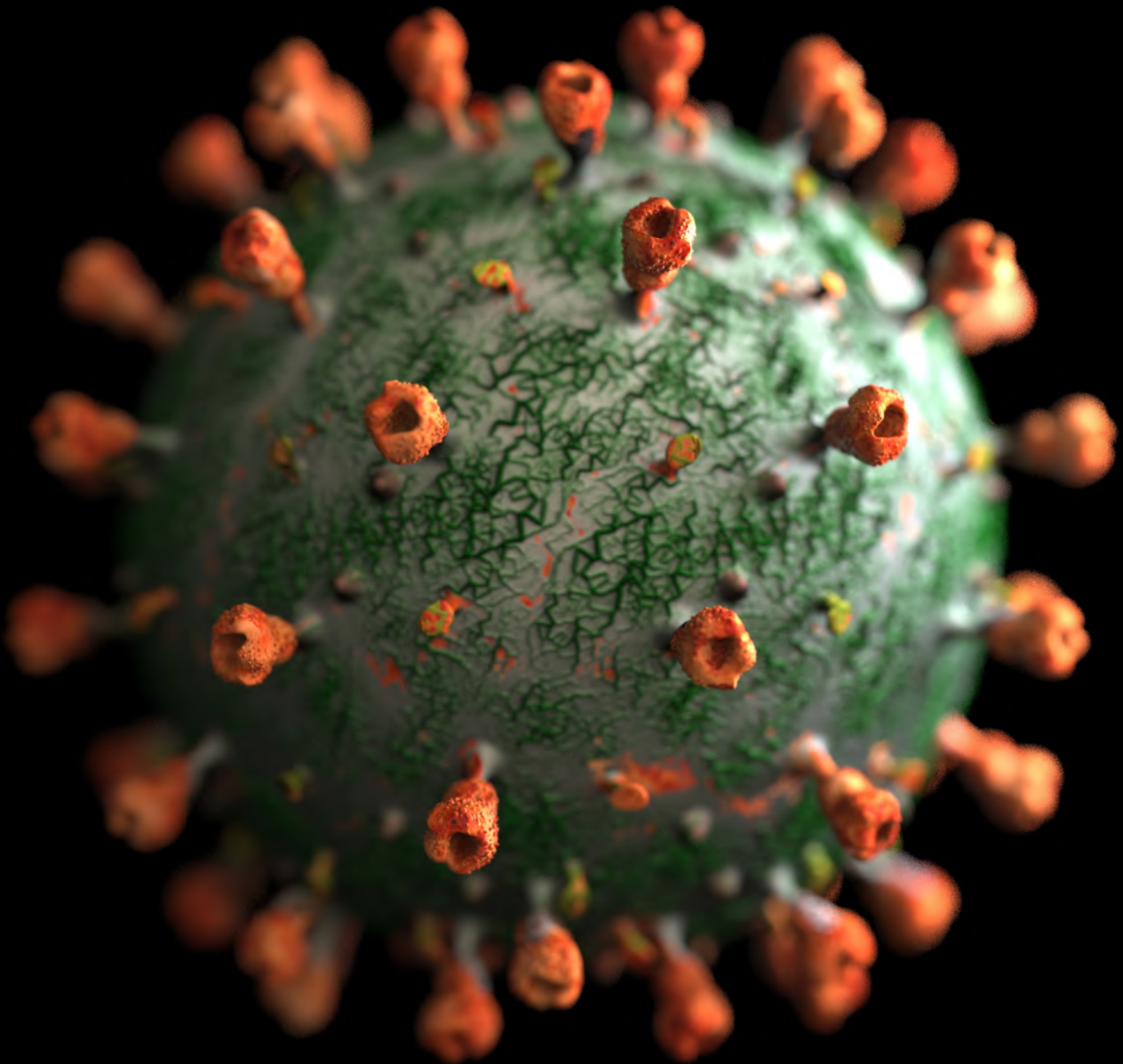
$(10)^{-15}$

FEMTO(f)

[METRE]

The radius of proton is 1  
femtometer(fm)





$(10)^{-18}$

ATT0(a)

[KILOGRAM]

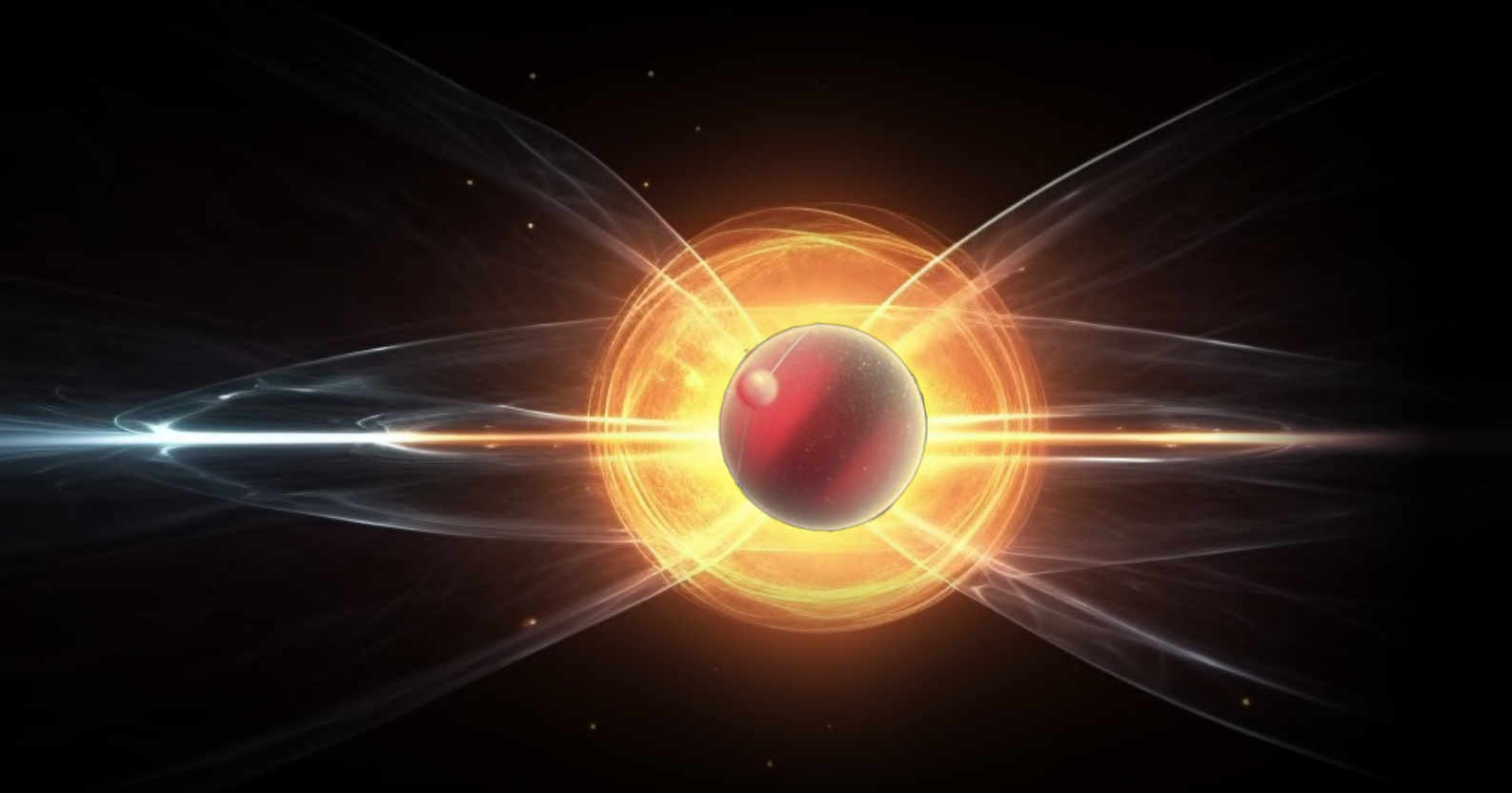
A single virion weighs around  
1 attokilogram(akg)

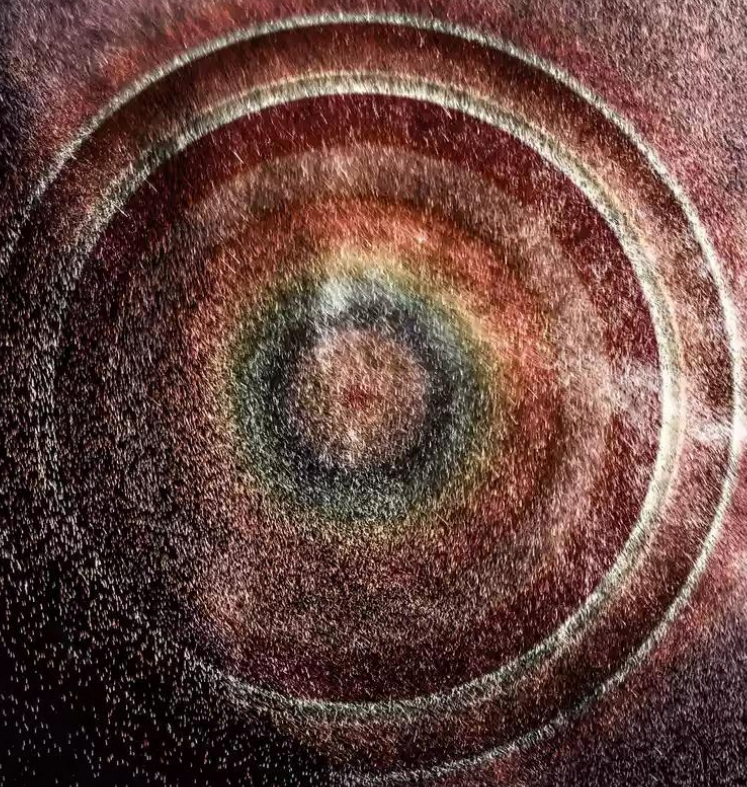
$(10)^{-21}$

ZEPTO(z)

[SECOND]

Light passes through a hydrogen atom in 7 zeptoseconds(zs), which is the shortest time period measured





$(10)^{-24}$   
YOCTO(y)  
[KILOGRAM]

Oganesson is the heaviest-known element weighing around 0.48 yoctokilogram(ykg)

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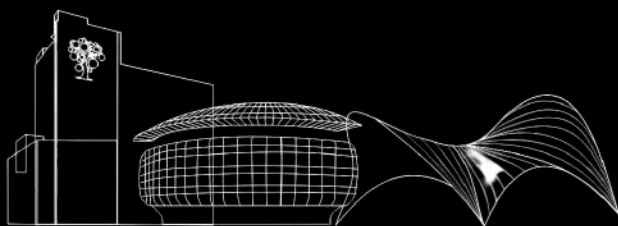
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