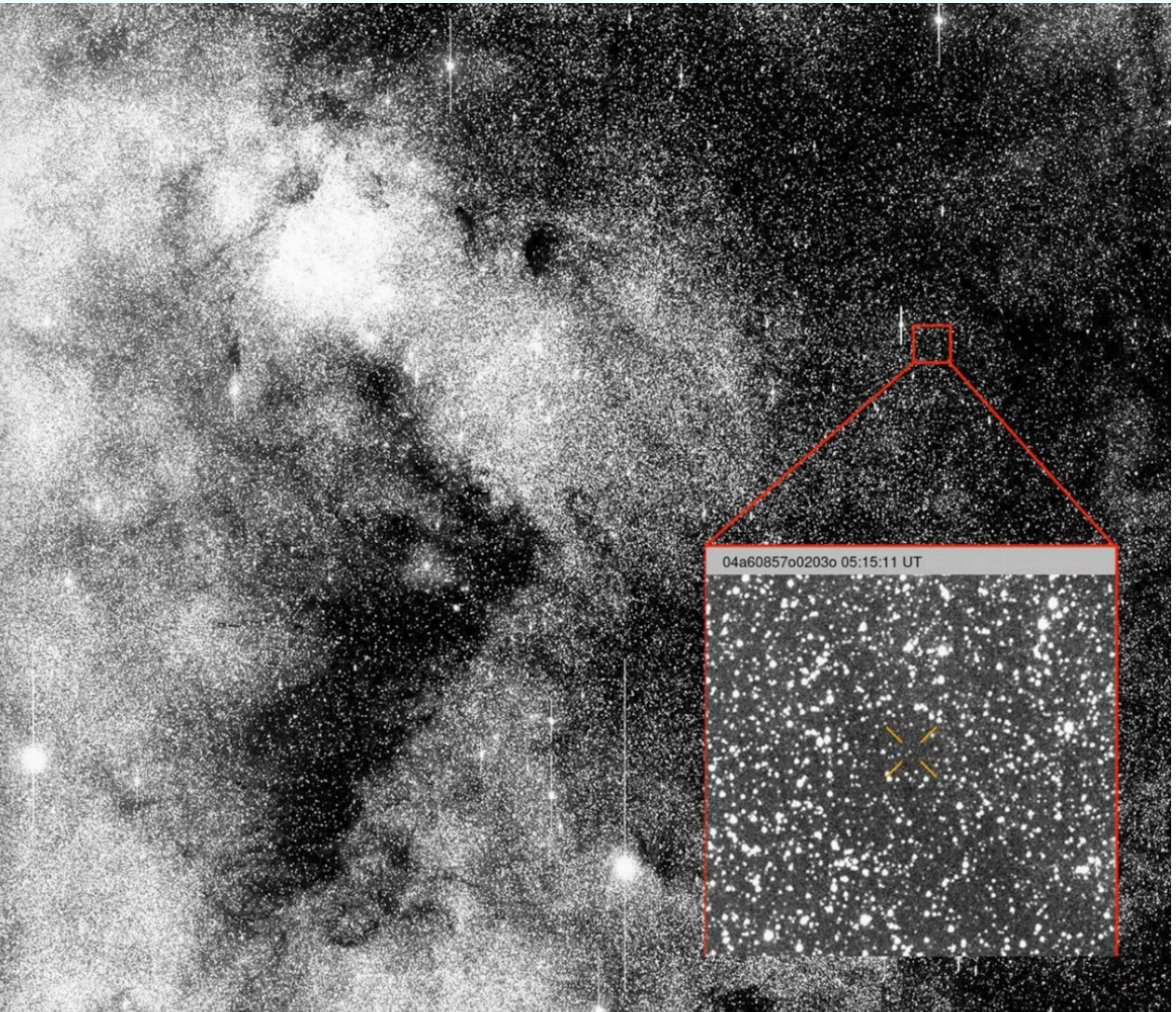
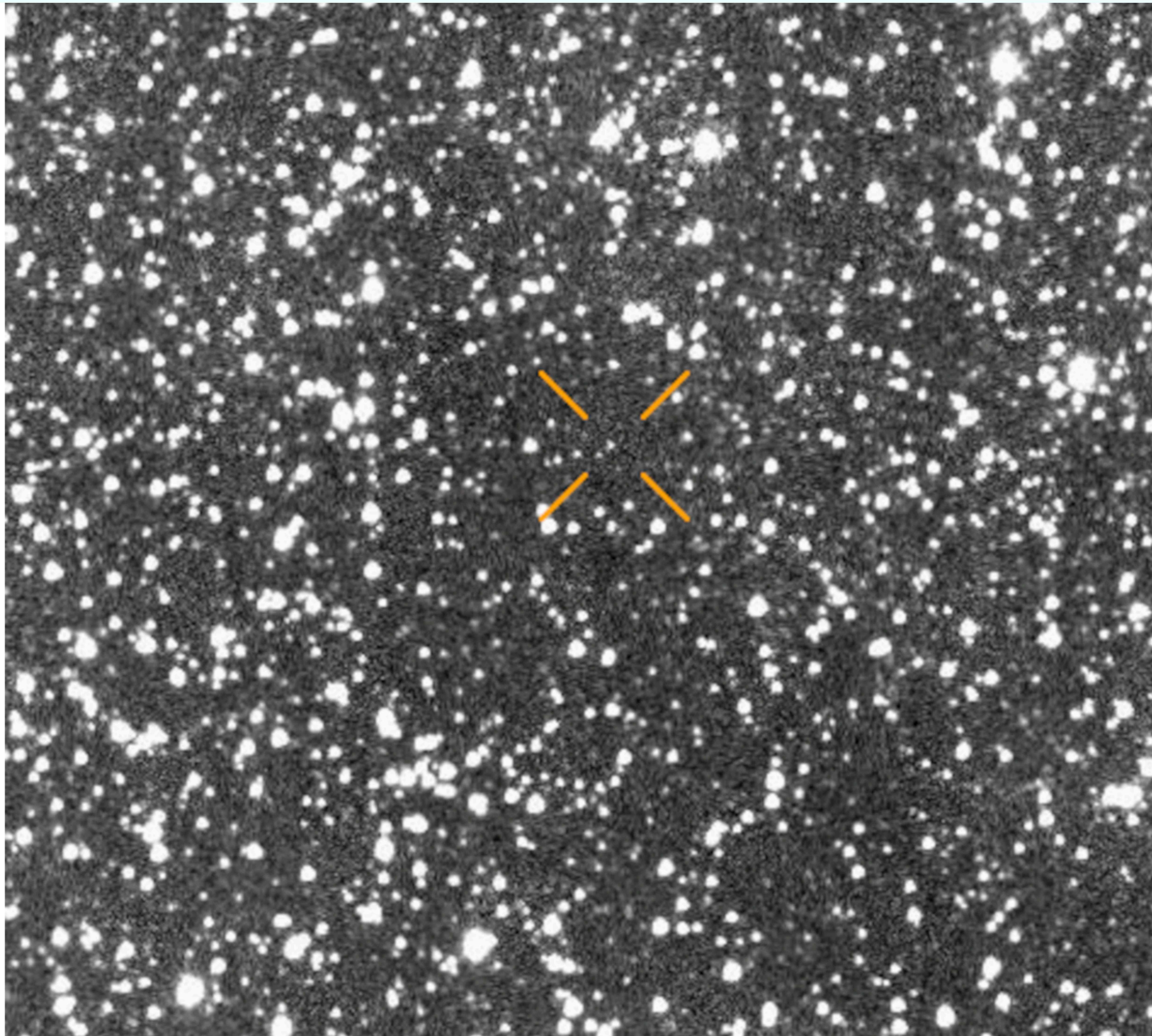
TechSlam

Sept. 4, 2025

The NASA-funded **ATLAS survey telescope in Chile** first reported that the ATLAS comet originated from interstellar space.

Comet 31/ATLAS when it was discovered on July 1, 2025.
The NASA-funded ATLAS survey telescope in Chile first reported that the comet originated from interstellar space.





The new, *experimental* supersonic airplane X-59

Technical Highlights

- Cruising Speed: Mach 1.4 (approx. 925mph or 1,510km/h).
- Altitude: Up to 55,000ft (16,800m).
- Length: 99.7ft; Wingspan: 29.5ft.
- Distinctive Design: A cockpit placed far back without a traditional forward-facing window. Instead, pilots use a high-resolution external vision system for navigation.

No information on how many people it can carry. Price estimate: $630 million


859
NASA
X-59
X-59


859
NASA
X-59

DNA Data Storage

How do you actually store digital information on DNA molecules?

How do you get it back again?

DNA Data Storage

1. Getting bits/bytes into base pairs
2. Building a RNA strand
3. Storing the code for long term
4. Retrieving the files
5. Reading the RNA strand

Uppercase Letters (A–Z) in 8-bit binary (ASCII format):

- A = 01000001
- B = 01000010
- C = 01000011
- D = 01000100
- E = 01000101
- F = 01000110
- G = 01000111
- H = 01001000
- I = 01001001
- J = 01001010
- K = 01001011
- L = 01001100
- M = 01001101
- N = 01001110
- O = 01001111
- P = 01010000
- Q = 01010001
- R = 01010010
- S = 01010011
- T = 01010100
- U = 01010101
- V = 01010110
- W = 01010111
- X = 01011000
- Y = 01011001
- Z = 01011010

For example: A: 01 00 00 01

1. Getting bits/bytes into base pairs

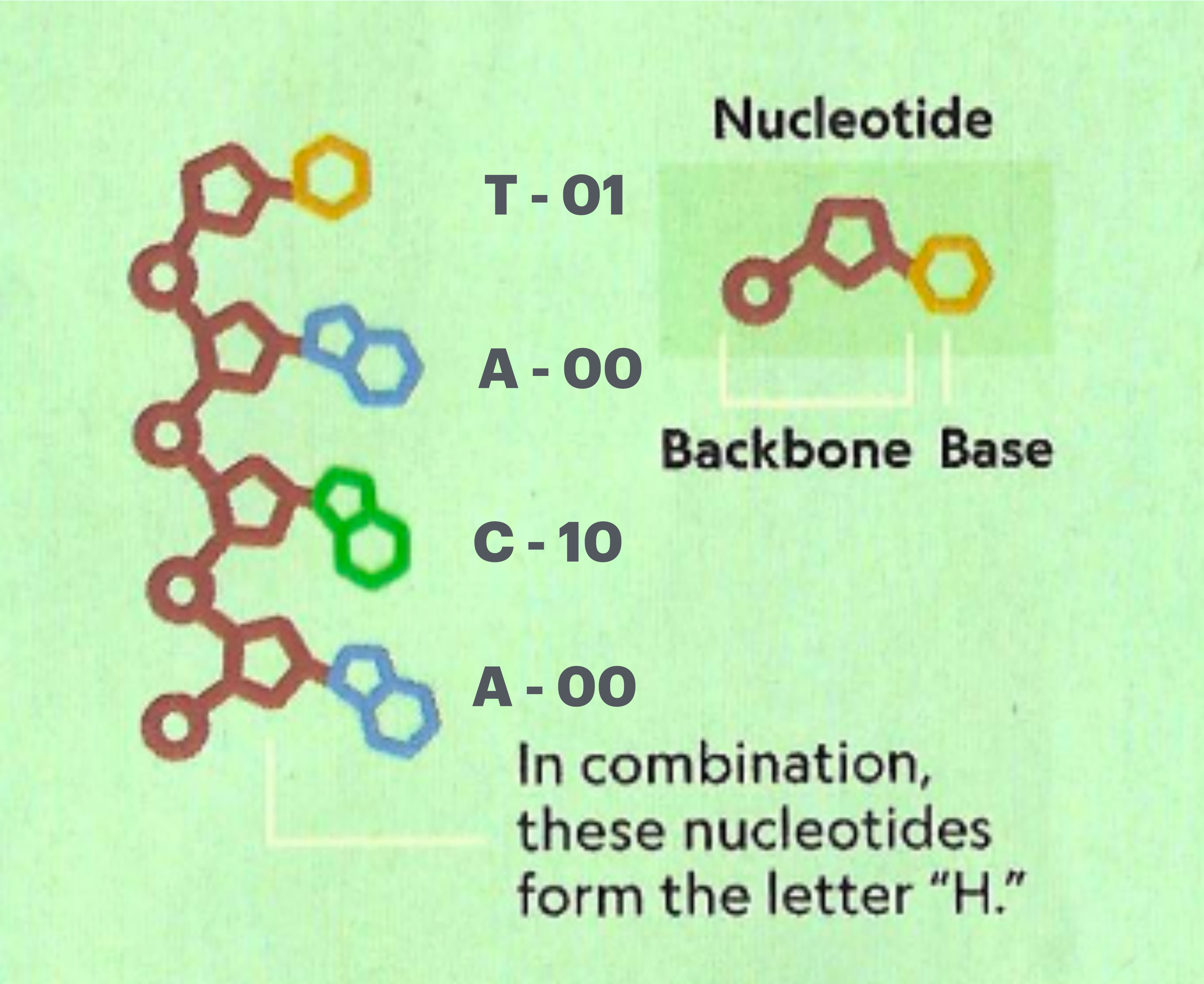
The 4 bases in genetics	Digital equivalent
- T (Thymine) -	01
- A (Adenine) -	00
- C (Cytosine) -	10
- G (Guanine) -	11

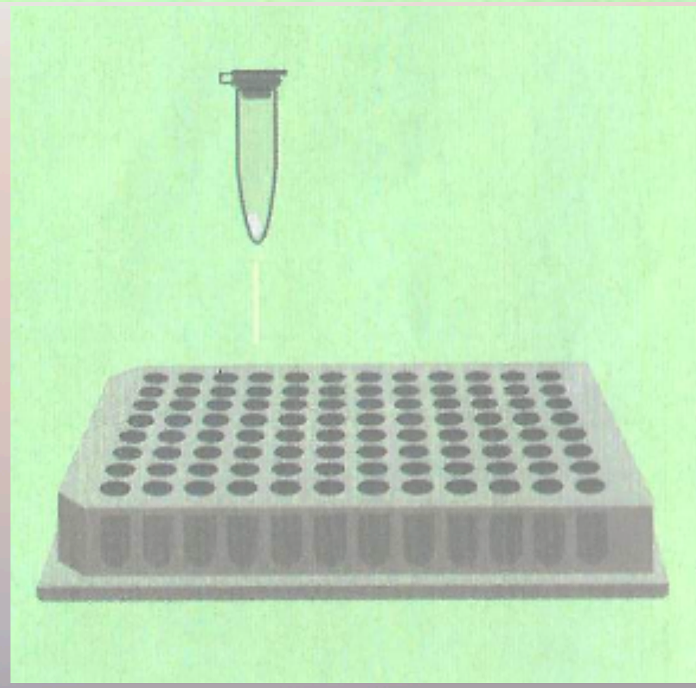
THURSDAY - as ASCII	- as RNA
T = 01 01 01 00	T T T A
H = 01 00 10 00	T A C A
U = 01 01 01 01	T T T T
R = 01 01 00 10	T T A C
S = 01 01 00 11	T T A G
D = 01 00 01 00	T A T A
A = 01 00 00 01	T A A T
Y = 01 01 10 01	T T C T

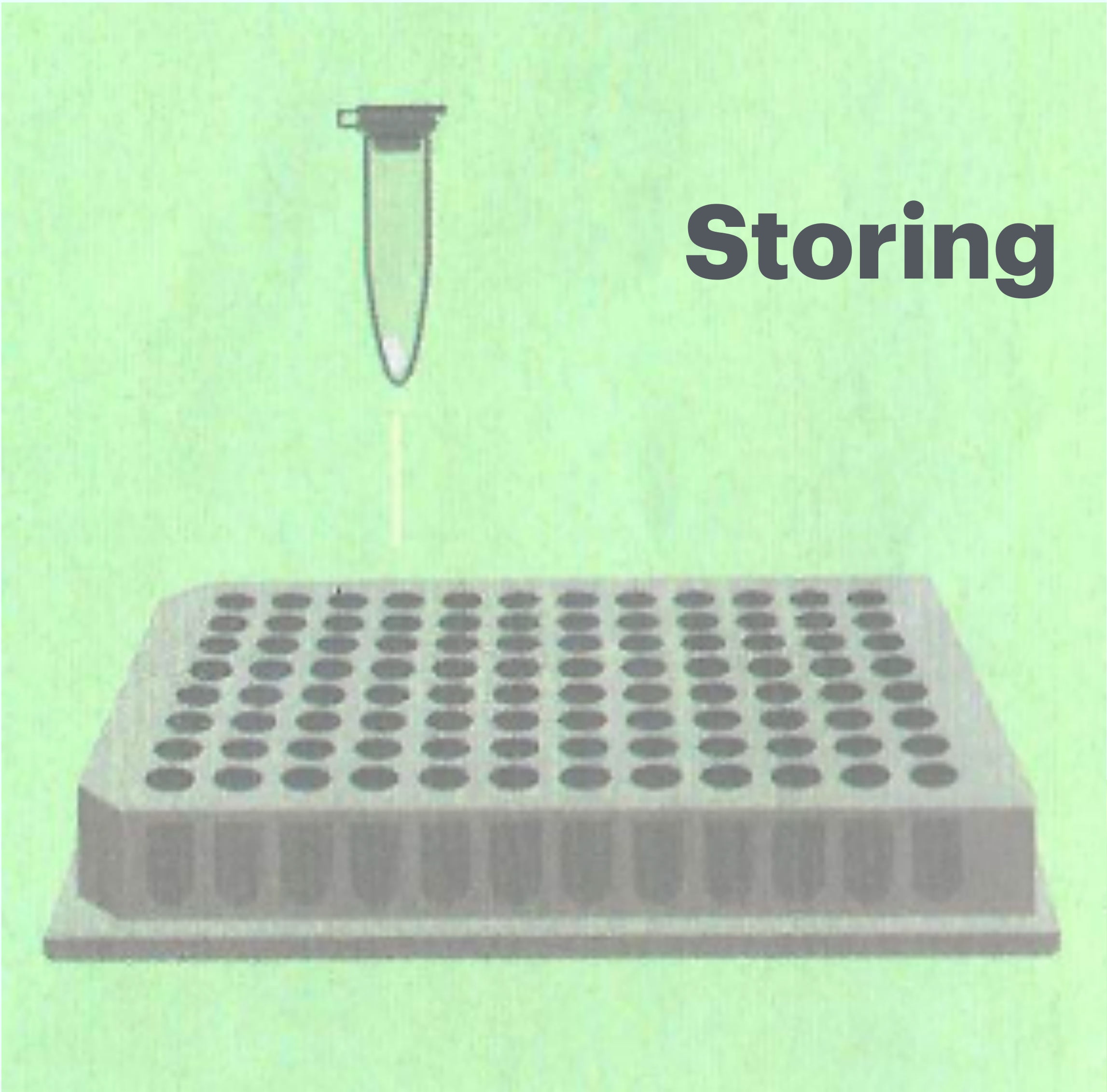
2. Building a RNA strand

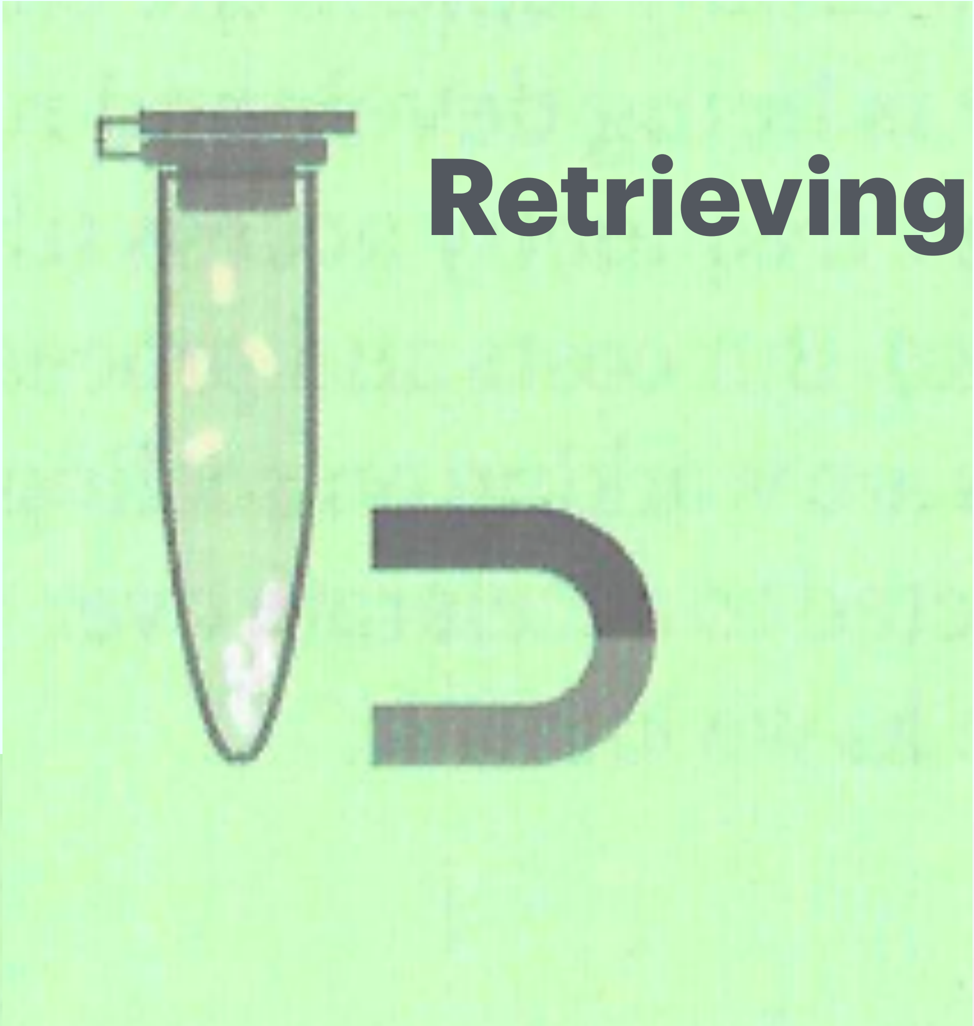
- T (Thymine) - 01
- A (Adenine) - 00
- C (Cytosine) - 10
- G (Guanine) - 11

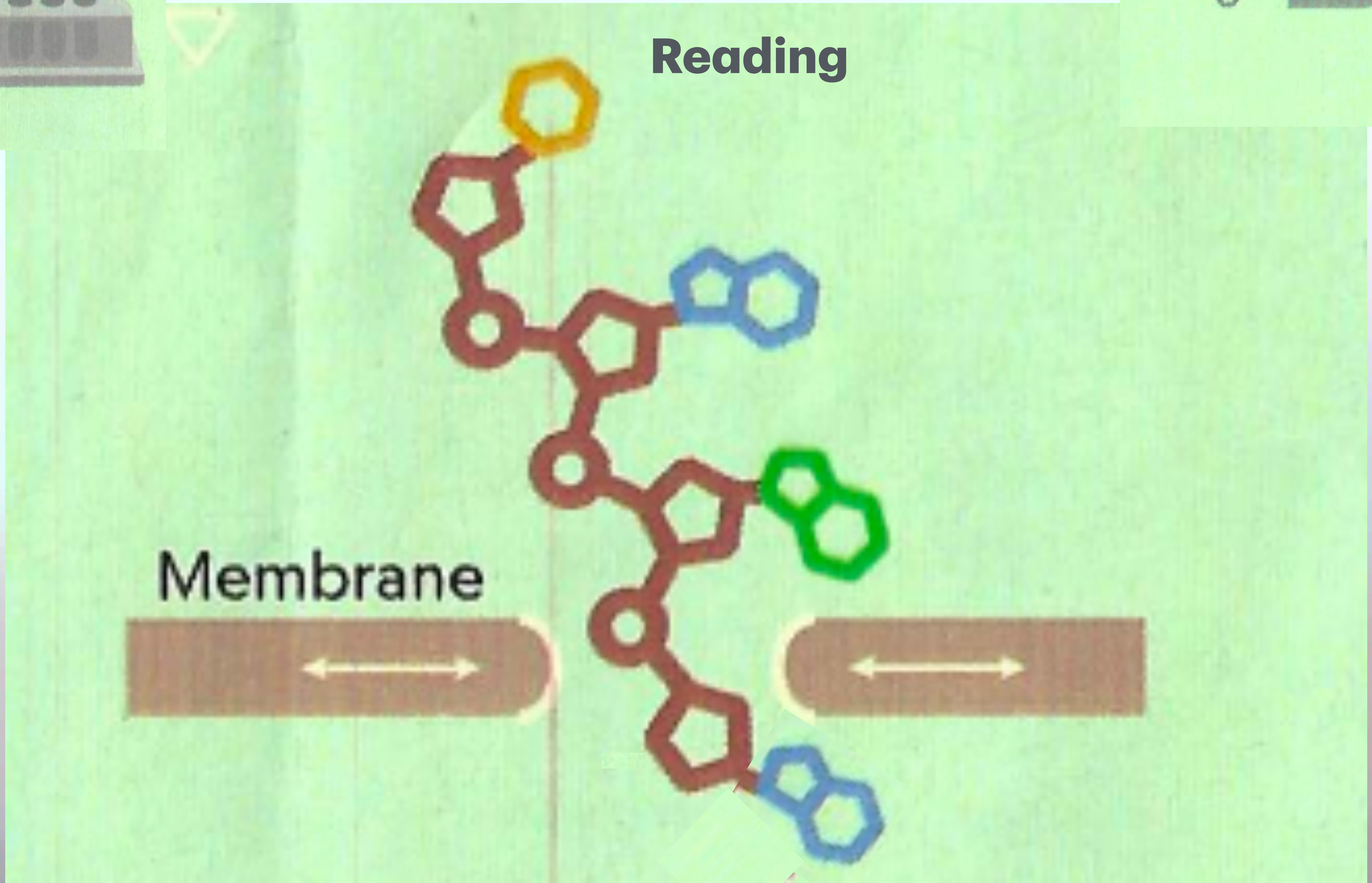
THURSDAY - as ASCII	- as RNA
T = 01 01 01 00	TTTA
H = 01 00 10 00	TACA
U = 01 01 01 01	TTTT
R = 01 01 00 10	TTAC
S = 01 01 00 11	TTAG
D = 01 00 01 00	TATA
A = 01 00 00 01	TAAT
Y = 01 01 10 01	TTCT






Storing


Retrieving


Reading
Membrane

So, what have we achieved?

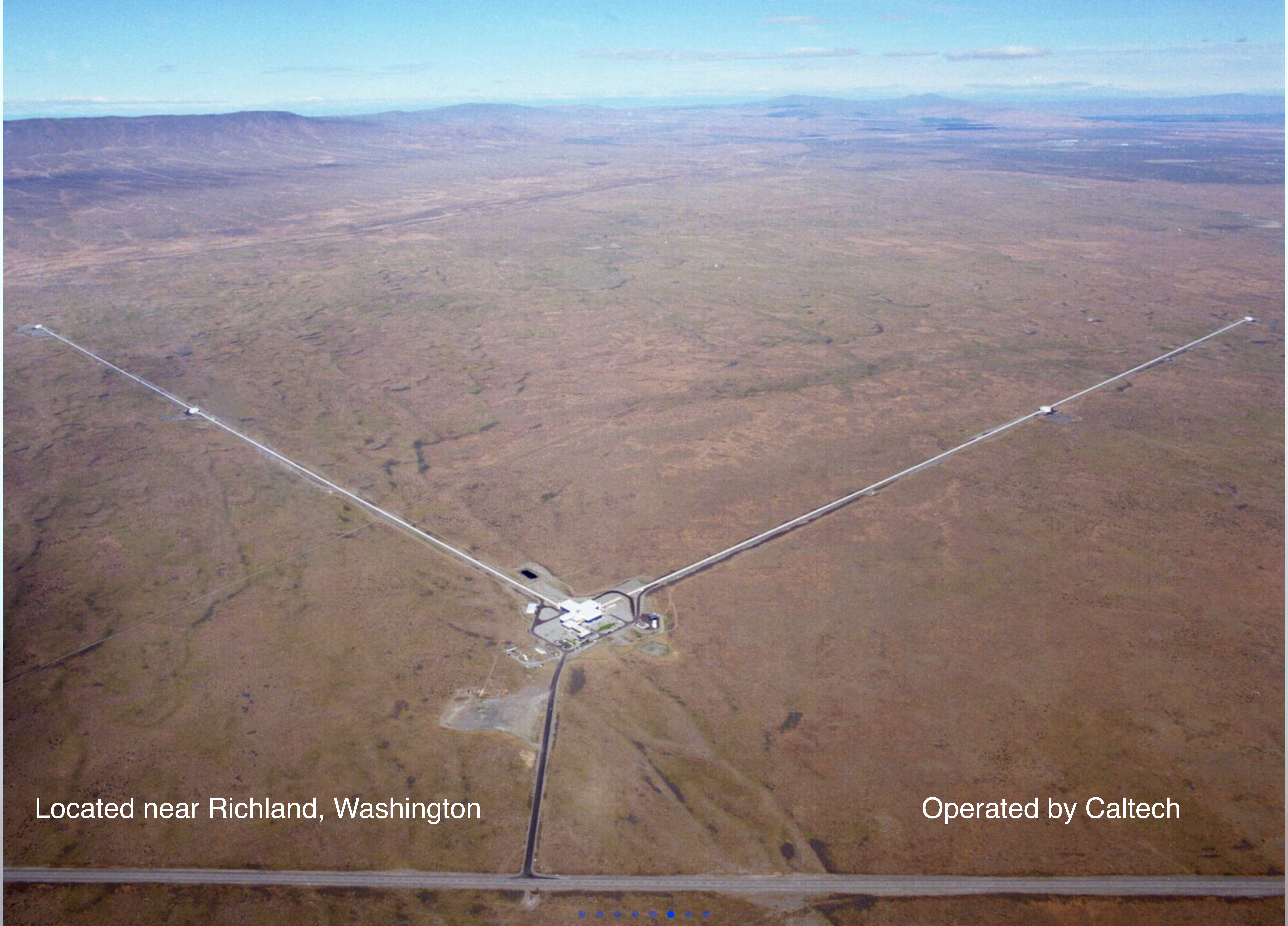
	Magnetic tape	RNA molecule
Quantity of data stored - GB/mm3	4.7	61,000
Reliable storage time - years	10-30	1000+
Cooling/power equipment - Gcal/TB	7,6	3
Energy use - kWh/TB	22,7	7,2

LIGO: Laser Interferometer Gravitational-Wave Observatory

LIGO’s gravitational wave detector is one of
the world’s most sensitive scientific instruments.

Located near Livingston/Baton Rouge, Louisiana

Operated by Caltech


Located near Richland, Washington
Operated by Caltech

LIGO’s gravitational wave detector

It can measure changes smaller than the width of a proton (2015).

But physicists had wanted to push sensitivity even further to detect different types of cosmic events.

Today (ten years later), it can measure changes smaller than 1-ten-thousands of a diameter of a proton.

THAT’S small . . . but how small is that, really . . . ?

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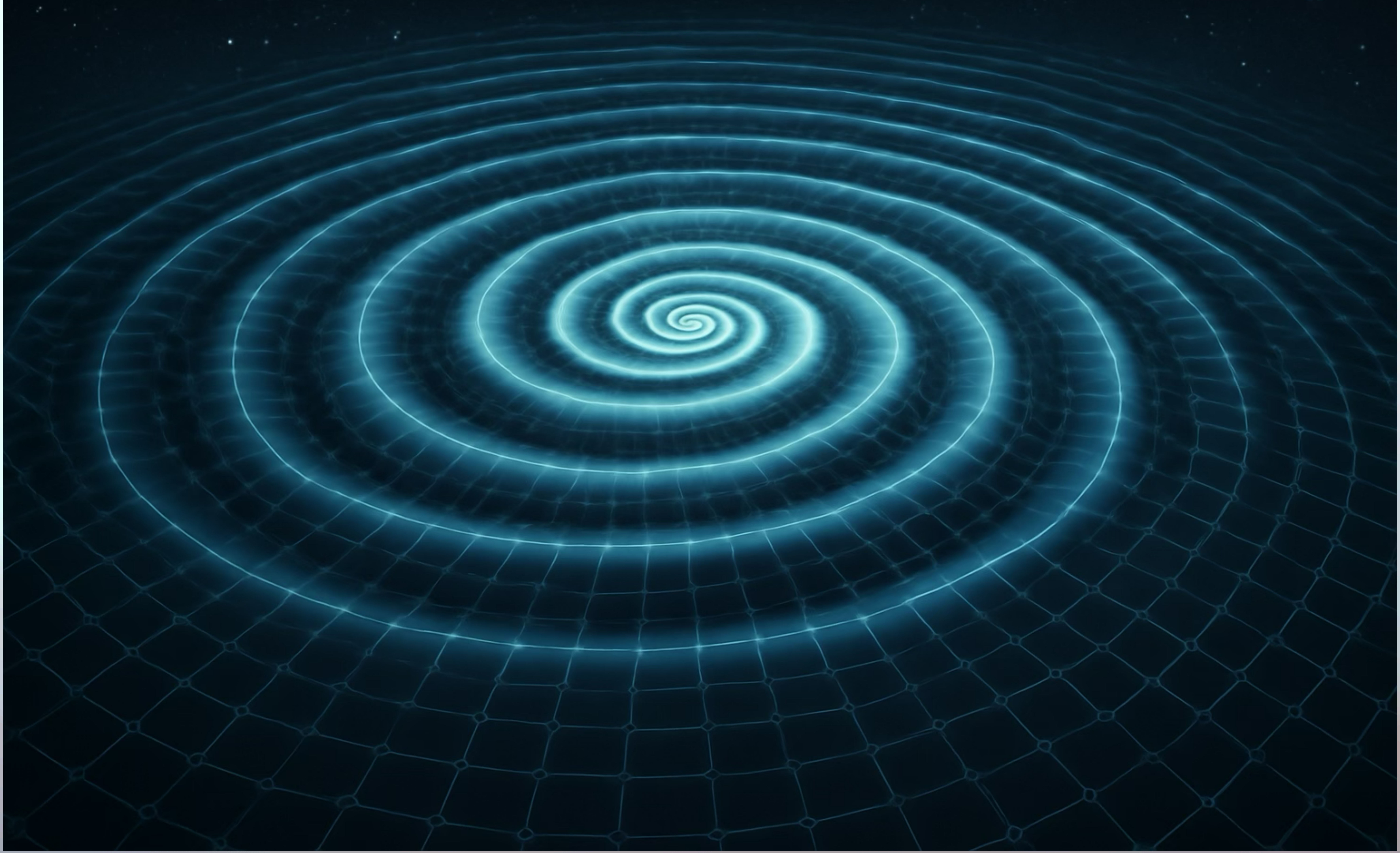
But physicists had wanted to push sensitivity even further to detect different types of cosmic events.

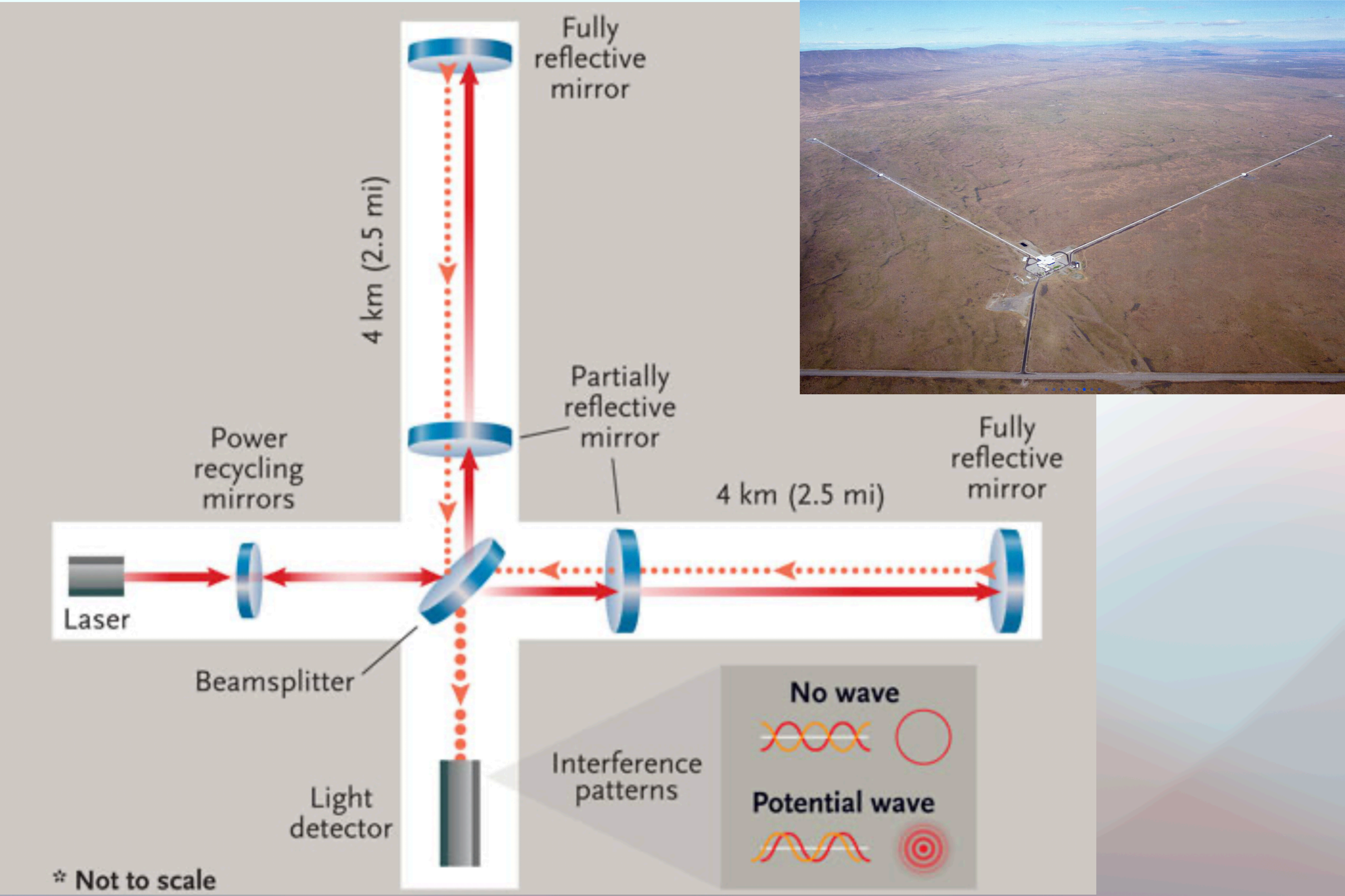
Today (ten years later), it can measure changes smaller than 1-ten-thousands of a diameter of a proton.

That is equivalent to measuring the distance to Alpha Centauri (4 LY away) down to the width of a human hair.

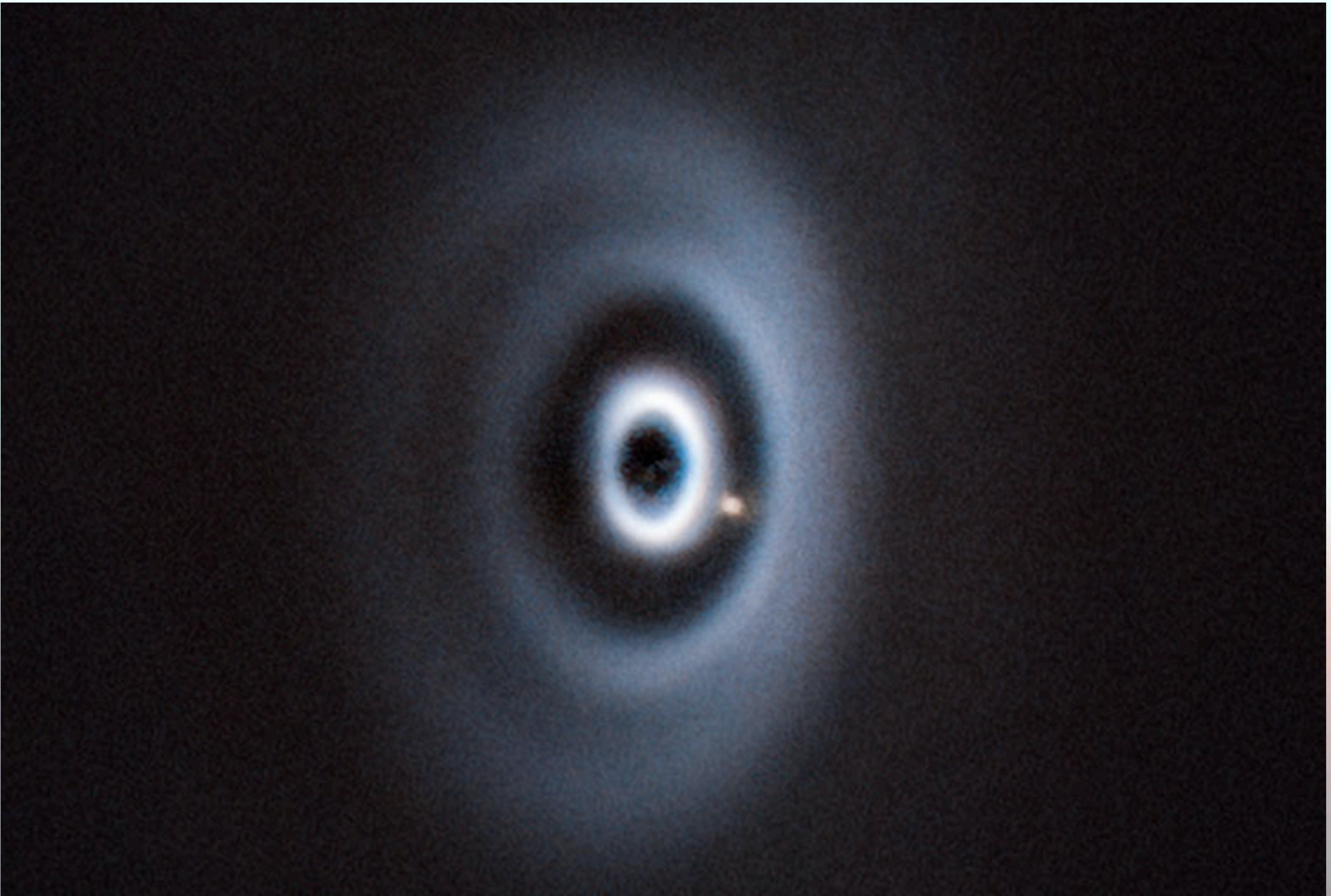
Mind you: 1 LY is 6 trillion miles

Gravitational waves




Fully
reflective
mirror
4 km (2.5 mi)
Partially
reflective
mirror
Power
recycling
mirrors
Fully
reflective
mirror
4 km (2.5 mi)
Laser
Beamsplitter
Light
detector
Interference
patterns
No wave
Potential wave
* Not to scale

This is the first-ever observation of an exoplanet actively carving a gap within a disk -- the earliest direct glimpse of planetary sculpting in action.



It's a young planet outside our Solar System.

At the center of this frame lies a young Sun-like star.

Surrounding the star is a bright, dusty protoplanetary disk -- the raw material of planets.

Gaps and concentric rings mark where a newborn world is gathering gas and dust under its gravity, clearing the way as it orbits the star.


That's All
Folks!
dreamstime