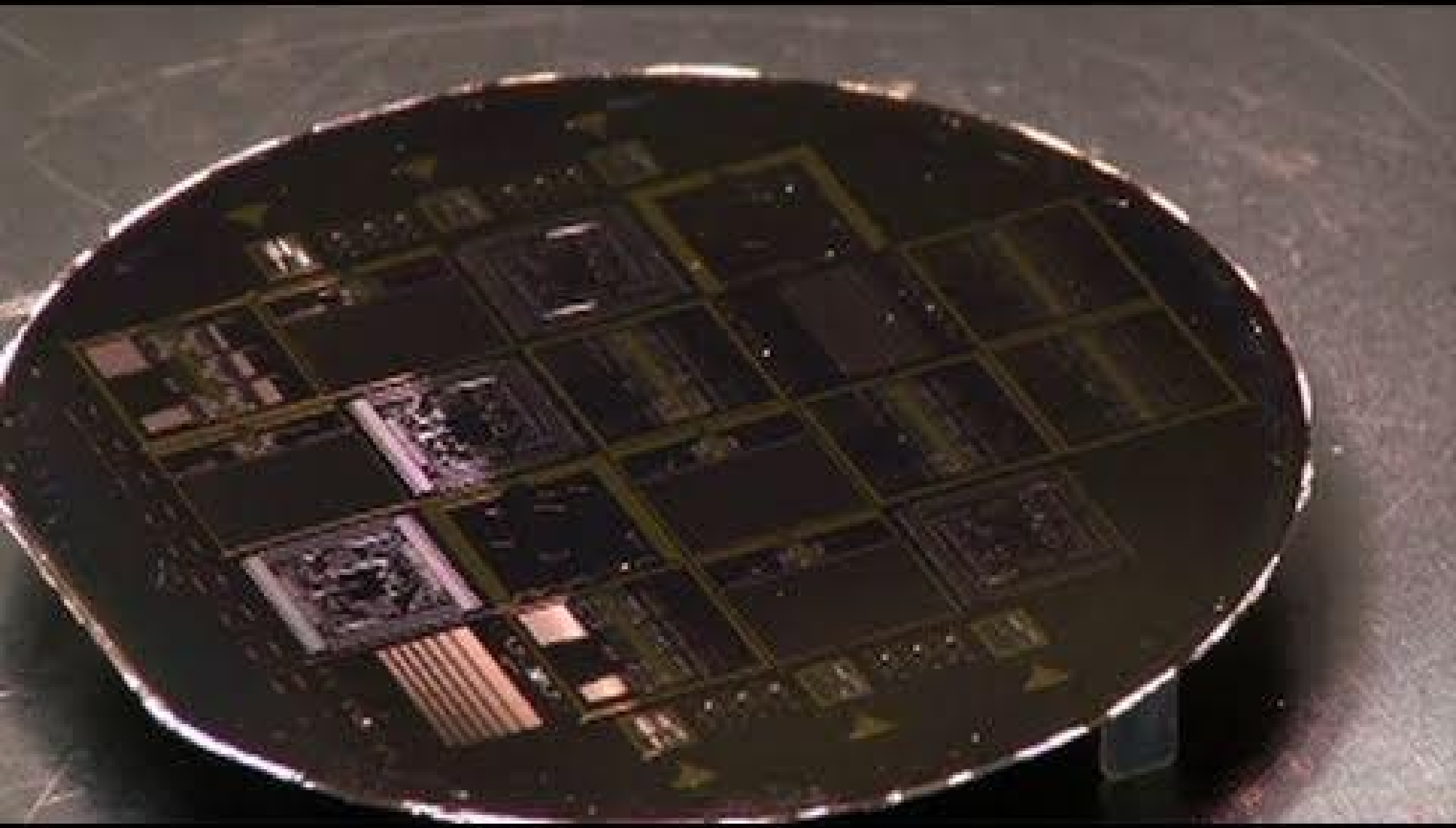

1
00:00:00,010 --> 00:00:03,040
[music]

2
00:00:03,060 --> 00:00:07,170
Scientists already know what the universe looked like when it was a baby,

3
00:00:07,190 --> 00:00:10,240
and they know what it looks like today.

4
00:00:10,260 --> 00:00:14,370
What they don't know is how it looked in its adolescence.

5
00:00:14,390 --> 00:00:18,460
But scientists may finally get a glimpse at this unseen stage in

6
00:00:18,480 --> 00:00:20,480
the development of the universe

7
00:00:20,500 --> 00:00:24,780
from a revolutionary new technology being developed at NASAs Goddard Space Flight Center.

8
00:00:24,800 --> 00:00:27,910
An instrument on a chip.

9
00:00:27,930 --> 00:00:31,930
This new, potentially game-changing instrument, called MicroSpec,

10
00:00:31,950 --> 00:00:37,050
is a far-infrared spectrometer that will be 10,000 times more sensitive

11
00:00:37,070 --> 00:00:40,080
and infinitely smaller than it's predecessor.

12
00:00:40,100 --> 00:00:45,220
Normally the size of an office desk, this spectrometer can fit in the palm of your hand.

13
00:00:45,240 --> 00:00:50,230

Scientists use spectrometers to measure properties of light to identify the composition

14
00:00:50,250 --> 00:00:53,300
and the physical properties of the object being observed.

15
00:00:53,320 --> 00:00:56,350
And now we are able to integrate both the optics,

16
00:00:56,370 --> 00:01:00,450
which separates out the colors, which we're trying to measure,

17
00:01:00,470 --> 00:01:04,540
we are able to integrate them to very sensitive detectors

18
00:01:04,560 --> 00:01:09,570
all on a silicon wafer. That's the big innovation here.

19
00:01:09,590 --> 00:01:14,650
The MicroSpec instrument will be able to gather data from objects so distant from Earth

20
00:01:14,670 --> 00:01:17,700
that they no longer can be seen in the visible light spectrum.

21
00:01:17,720 --> 00:01:20,880
By building an instrument like MicroSpec

22
00:01:20,900 --> 00:01:25,910
and studying this era, where galaxies were beginning to form,

23
00:01:25,930 --> 00:01:28,990
gives us a very clear picture

24
00:01:29,010 --> 00:01:36,020
of how the universe developed into the kind of place that can support life like us.

25
00:01:36,040 --> 00:01:43,050
But in order to see these things clearly, the spectrometer must be cooled to temperatures close to absolute zer

26
00:01:43,070 --> 00:01:47,200
so heat from the instrument will not interfere with the incoming, faint infrared signal.

27
00:01:47,220 --> 00:01:51,280
We can get an observation in 10 seconds with this

28
00:01:51,300 --> 00:01:56,300
cold telescope that would take a year with an ambient telescope like the Hubble.