1
00:00:15,730 --> 00:00:14,109
hi I'm Stephanie Mila a research

2
00:00:18,040 --> 00:00:15,740
scientist working with NASA's Swift

3
00:00:19,830 --> 00:00:18,050
satellite at Goddard Space Flight Center

4
00:00:23,200 --> 00:00:19,840
in Greenbelt Maryland

5
00:00:25,720 --> 00:00:23,210
this is m31 the nearest large spiral

6
00:00:27,069 --> 00:00:25,730
galaxy to our own is about two and a

7
00:00:29,650 --> 00:00:27,079
half million light-years away

8
00:00:34,150 --> 00:00:29,660
and more than 220 thousand light-years

9
00:00:35,950 --> 00:00:34,160
across this is how we're used to seeing

10
00:00:39,369 --> 00:00:35,960
it in the visible light captured by

11
00:00:41,800 --> 00:00:39,379
ground-based telescopes but visible

12
00:00:44,620 --> 00:00:41,810
light never tells the whole story so

13
00:00:47,530 --> 00:00:44,630

between May and July 2008 Swift's

14
00:00:49,810 --> 00:00:47,540
ultraviolet optical telescope captured

15
00:00:52,690 --> 00:00:49,820
330 images of m31

16
00:00:58,060 --> 00:00:52,700
and three ultraviolet wavelengths the

17
00:01:00,700 --> 00:00:58,070
total exposure time 24 hours we combined

18
00:01:02,770 --> 00:01:00,710
these images into this mosaic it's the

19
00:01:06,190 --> 00:01:02,780
most detailed view of m31 in the

20
00:01:07,510 --> 00:01:06,200
ultraviolet to date the first thing you

21
00:01:09,880 --> 00:01:07,520
notice is the striking difference

22
00:01:13,569 --> 00:01:09,890
between the galaxy's central bulge and

23
00:01:15,609 --> 00:01:13,579
its spiral arms the bulges smoother and

24
00:01:18,819 --> 00:01:15,619
redder because it's full of older and

25
00:01:21,010 --> 00:01:18,829
cooler stars very few new stars form

26
00:01:23,190 --> 00:01:21,020
here because most of the materials

27
00:01:28,209 --> 00:01:23,200
needed to make them have been depleted

28
00:01:29,949 --> 00:01:28,219
in contrast and 31 spiral arms sparkly

29
00:01:34,359 --> 00:01:29,959
with dense glasses of hot young blue

30
00:01:36,429 --> 00:01:34,369
stars as in our own galaxy the disks

31
00:01:38,080 --> 00:01:36,439
conspire arms contain most of the gas

32
00:01:42,380 --> 00:01:38,090
and dust needed to produce new

33
00:01:48,389 --> 00:01:45,450
m31 x' clusters are especially plentiful

34
00:01:49,919 --> 00:01:48,399
in a giant ring around the galaxy it's

35
00:01:53,609 --> 00:01:49,929
about a hundred and fifty thousand light

36
00:01:55,800 --> 00:01:53,619
years across this Ring of Fire exists

37
00:01:59,209 --> 00:01:55,810
because of tile interactions with small

38
00:02:01,169 --> 00:01:59,219

satellite galaxies speaking of which

39
00:02:04,459 --> 00:02:01,179
this is m32

40
00:02:06,779 --> 00:02:04,469
one of many dwarf galaxies orbiting m31

41
00:02:08,789 --> 00:02:06,789
these galaxies are usually not very

42
00:02:12,539 --> 00:02:08,799
bright in the ultraviolet because they

43
00:02:14,670 --> 00:02:12,549
lack young stars but m32 score is so

44
00:02:20,009 --> 00:02:14,680
bright in the UV because it likely

45
00:02:21,990 --> 00:02:20,019
contains many blue and old stars the

46
00:02:25,229 --> 00:02:22,000
Swift mosaic reveals some twenty

47
00:02:27,150 --> 00:02:25,239
thousand UV sources it's important to

48
00:02:29,400 --> 00:02:27,160
study star formation processes in nearby

49
00:02:32,430 --> 00:02:29,410
galaxies so we can understand by

50
00:02:34,500 --> 00:02:32,440
breathing in distant galaxies this rich

51
00:02:37,470 --> 00:02:34,510
portray in three different ultraviolet

52
00:02:39,869 --> 00:02:37,480
wavelength allows us to study how m31