1
00:00:06,309 --> 00:00:04,470
in april 2020 astronomers detected an

2
00:00:08,629 --> 00:00:06,319
unusually bright and powerful radio

3
00:00:09,990 --> 00:00:08,639
signal never before recorded in our home

4
00:00:12,470 --> 00:00:10,000
galaxy

5
00:00:14,390 --> 00:00:12,480
the source is a magnetar a type of

6
00:00:16,870 --> 00:00:14,400
compact object with the strongest

7
00:00:19,670 --> 00:00:16,880
magnetic fields in the cosmos

8
00:00:21,670 --> 00:00:19,680
like pulsars and neutron stars magnetars

9
00:00:24,150 --> 00:00:21,680
are the crushed cores left behind when a

10
00:00:25,910 --> 00:00:24,160
massive star explodes but their super

11
00:00:27,670 --> 00:00:25,920
strong magnetic fields put them in a

12
00:00:29,349 --> 00:00:27,680
class by themselves

13
00:00:31,750 --> 00:00:29,359

the fields are up to a thousand times

14
00:00:33,750 --> 00:00:31,760
stronger than typical neutron stars and

15
00:00:35,750 --> 00:00:33,760
over 10 trillion times stronger than a

16
00:00:37,590 --> 00:00:35,760
refrigerator magnet

17
00:00:39,350 --> 00:00:37,600
they can rip molecules apart from

18
00:00:41,750 --> 00:00:39,360
thousands of miles away

19
00:00:45,190 --> 00:00:41,760
distort the shapes of atoms and store

20
00:00:49,270 --> 00:00:45,200
enormous amounts of energy on april 27th

21
00:00:51,830 --> 00:00:49,280
the magnetar named sgr 1935 produced a

22
00:00:54,470 --> 00:00:51,840
rapid-fire storm of short powerful x-ray

23
00:00:57,110 --> 00:00:54,480
bursts that lasted hours

24
00:00:59,270 --> 00:00:57,120
the activity first spotted by swift was

25
00:01:01,590 --> 00:00:59,280
also monitored by nasa's fermi gamma-ray

26
00:01:03,349 --> 00:01:01,600
space telescope and the nicer x-ray

27
00:01:04,390 --> 00:01:03,359
telescope on the international space

28
00:01:07,350 --> 00:01:04,400
station

29
00:01:09,510 --> 00:01:07,360
along with other space missions

30
00:01:10,550 --> 00:01:09,520
as the storm wound down early on april

31
00:01:13,429 --> 00:01:10,560
28th

32
00:01:15,670 --> 00:01:13,439
nicer recorded some 200 x-ray bursts in

33
00:01:18,870 --> 00:01:15,680
just 20 minutes

34
00:01:20,469 --> 00:01:18,880
later that day sgr 1935 fired off

35
00:01:22,390 --> 00:01:20,479
another x-ray burst

36
00:01:23,670 --> 00:01:22,400
this time though it was accompanied by

37
00:01:26,310 --> 00:01:23,680
something new

38
00:01:29,350 --> 00:01:26,320

a powerful pulse of radio waves lasting

39
00:01:31,429 --> 00:01:29,360
a thousandth of a second

40
00:01:33,190 --> 00:01:31,439
chime a radio telescope in british

41
00:01:35,510 --> 00:01:33,200
columbia led by several canadian

42
00:01:37,270 --> 00:01:35,520
universities discovered the signal and

43
00:01:39,830 --> 00:01:37,280
determined it came from the vicinity of

44
00:01:42,469 --> 00:01:39,840
sgr 1935

45
00:01:44,469 --> 00:01:42,479
another experiment called stair 2 and

46
00:01:46,710 --> 00:01:44,479
operated by caltech and nasa's jet

47
00:01:48,389 --> 00:01:46,720
propulsion laboratory saw an even

48
00:01:50,630 --> 00:01:48,399
brighter signal at different radio

49
00:01:53,109 --> 00:01:50,640
wavelengths

50
00:01:55,190 --> 00:01:53,119
since 2007 astronomers have been trying

51
00:01:57,749 --> 00:01:55,200
to understand the sources of powerful

52
00:02:00,789 --> 00:01:57,759
millisecond radio signals called fast

53
00:02:03,990 --> 00:02:00,799
radio bursts seen from other galaxies

54
00:02:06,550 --> 00:02:04,000
magnetars have been prominent suspects

55
00:02:09,510 --> 00:02:06,560
the duration and energy release of sgr

56
00:02:12,470 --> 00:02:09,520
1935's radio signal is closer to fast

57
00:02:14,470 --> 00:02:12,480
radio bursts than any other source

58
00:02:16,869 --> 00:02:14,480
for the first time astronomers saw

59
00:02:18,710 --> 00:02:16,879
magnetar in our own backyard produce a

60
00:02:20,229 --> 00:02:18,720
signal only previously seen in other

61
00:02:22,229 --> 00:02:20,239
galaxies

62
00:02:24,309 --> 00:02:22,239
the discovery strengthens the case that

63
00:02:26,020 --> 00:02:24,319

magnetars are responsible for at least

64
00:02:27,270 --> 00:02:26,030
some fast radio bursts

65
00:02:29,350 --> 00:02:27,280
[Music]

66
00:02:31,110 --> 00:02:29,360
data from nyser and fermi on x-ray

67
00:02:32,470 --> 00:02:31,120
bursts at the end of the storm

68
00:02:35,190 --> 00:02:32,480
showed that they differed from the one

69
00:02:37,030 --> 00:02:35,200
that coincided with the radio signal

70
00:02:39,030 --> 00:02:37,040
this event's characteristics set it

71
00:02:41,190 --> 00:02:39,040
apart from the other eruptions

72
00:02:42,790 --> 00:02:41,200
and further study may provide clues

73
00:02:44,070 --> 00:02:42,800
about how it also powered the radio

74
00:02:45,910 --> 00:02:44,080
burst

75
00:02:48,229 --> 00:02:45,920
radio waves from normal pulsars

76
00:02:51,190 --> 00:02:48,239
originate high above their surfaces

77
00:02:53,509 --> 00:02:51,200
exactly where and how we don't know

78
00:02:55,750 --> 00:02:53,519
a big eruption could launch a cloud of

79
00:02:57,750 --> 00:02:55,760
plasma to high enough that a radio burst

80
00:02:59,670 --> 00:02:57,760
could form

81
00:03:02,550 --> 00:02:59,680
never before have astronomers seen a

82
00:03:04,390 --> 00:03:02,560
fast radio burst so close to home

83
00:03:05,589 --> 00:03:04,400
it's just one more reason to watch the

84
00:03:07,830 --> 00:03:05,599
skies

85
00:03:14,550 --> 00:03:07,840
and to keep tabs on the strongest