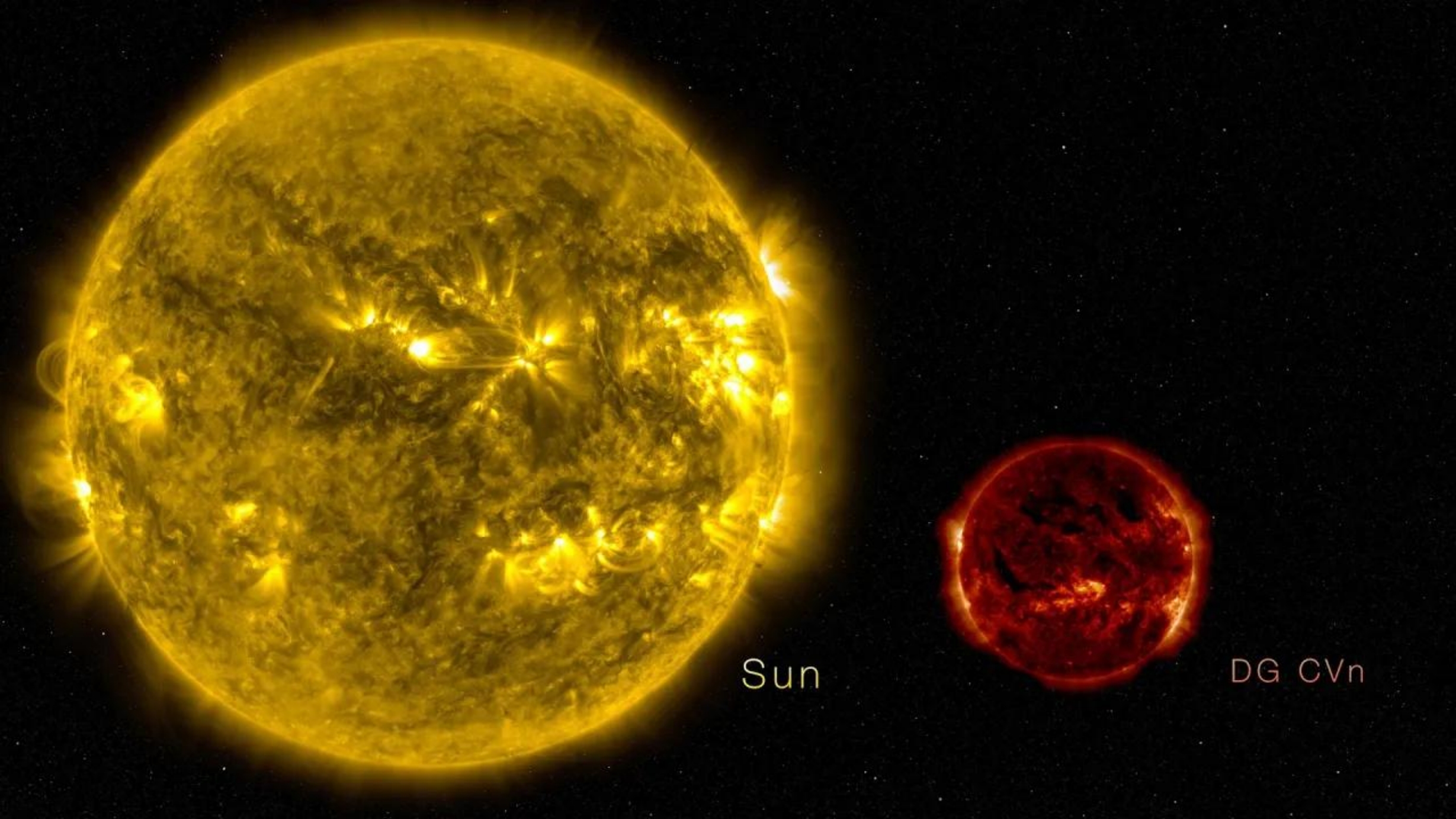
Sun
DG CVn

1
00:00:09,669 --> 00:00:06,710
when i got the news on april 23rd

2
00:00:13,350 --> 00:00:09,679
earlier this year that a flare had been

3
00:00:14,709 --> 00:00:13,360
detected by swift and it was coming from

4
00:00:19,269 --> 00:00:14,719
a nearby

5
00:00:21,029 --> 00:00:19,279
flare star called dg cvn i was initially

6
00:00:24,150 --> 00:00:21,039
very surprised

7
00:00:28,230 --> 00:00:24,160
swift doesn't normally detect flares

8
00:00:32,069 --> 00:00:28,240
from nearby flare stars and dg cvn

9
00:00:34,069 --> 00:00:32,079
is a relatively unknown star

10
00:00:35,190 --> 00:00:34,079
there are a few things we know about dg

11
00:00:37,750 --> 00:00:35,200
cvn

12
00:00:40,549 --> 00:00:37,760
it is an m-class star also called a red

13
00:00:41,750 --> 00:00:40,559

dwarf and is located only about 60 light

14
00:00:44,470 --> 00:00:41,760
years away

15
00:00:47,029 --> 00:00:44,480
it's a dim little red star it has a

16
00:00:49,110 --> 00:00:47,039
luminosity that's about one thousandth

17
00:00:51,510 --> 00:00:49,120
the luminosity of the sun

18
00:00:53,110 --> 00:00:51,520
it has a mass that's about one-third the

19
00:00:56,150 --> 00:00:53,120
mass of the sun

20
00:00:58,869 --> 00:00:56,160
and a radius that's about one-third the

21
00:01:01,430 --> 00:00:58,879
radius of the sun

22
00:01:04,310 --> 00:01:01,440
the largest solar flare ever recorded

23
00:01:06,390 --> 00:01:04,320
happened on november 4th 2003.

24
00:01:08,550 --> 00:01:06,400
it was so powerful that it overloaded

25
00:01:12,550 --> 00:01:08,560
the sensors measuring it but later

26
00:01:14,310 --> 00:01:12,560
calculations put it at an x-45

27
00:01:15,350 --> 00:01:14,320
flares are classified according to their

28
00:01:17,429 --> 00:01:15,360
strength

29
00:01:21,350 --> 00:01:17,439
the smallest ones are b-class followed

30
00:01:25,749 --> 00:01:21,360
by c m and x the largest

31
00:01:31,190 --> 00:01:25,759
an x-45 flare is a very powerful flare

32
00:01:37,670 --> 00:01:33,990
we can estimate how big the flare on

33
00:01:38,710 --> 00:01:37,680
dgcvn was with respect to the solar

34
00:01:41,109 --> 00:01:38,720
scale

35
00:01:42,789 --> 00:01:41,119
it would have been an x

36
00:01:45,270 --> 00:01:42,799
100 000

37
00:01:47,190 --> 00:01:45,280
so this is several orders of magnitude

38
00:01:49,109 --> 00:01:47,200

larger than the biggest solar flare

39
00:01:51,990 --> 00:01:49,119
we've ever seen

40
00:01:55,670 --> 00:01:52,000
the flare that swift triggered on from

41
00:01:59,109 --> 00:01:55,680
dg cvn was only the beginning of what

42
00:02:02,469 --> 00:01:59,119
turned out to be a fairly extended

43
00:02:07,990 --> 00:02:02,479
series of flares a flare event

44
00:02:09,749 --> 00:02:08,000
if you will that lasted almost 20 days

45
00:02:11,830 --> 00:02:09,759
this was a very different star than the

46
00:02:13,430 --> 00:02:11,840
sun so we don't really have to worry

47
00:02:14,229 --> 00:02:13,440
about this happening in the present day

48
00:02:17,430 --> 00:02:14,239
sun

49
00:02:18,949 --> 00:02:17,440
such large events may have occurred in

50
00:02:21,750 --> 00:02:18,959
the present day sun

51
00:02:24,150 --> 00:02:21,760
the activity levels are much lower the

52
00:02:26,309 --> 00:02:24,160
fundamental reason that dg cvn is more

53
00:02:28,710 --> 00:02:26,319
active in the sun is it's a very young

54
00:02:31,589 --> 00:02:28,720
star 30 million years it's rapidly

55
00:02:33,750 --> 00:02:31,599
rotating young stars are born that way

56
00:02:36,070 --> 00:02:33,760
and rapid rotation is one of the key

57
00:02:38,229 --> 00:02:36,080
ingredients which powers activity the

58
00:02:39,430 --> 00:02:38,239
faster the rotation the greater the

59
00:02:41,509 --> 00:02:39,440
activity

60
00:02:43,589 --> 00:02:41,519
while not a threat to us the massive

61
00:02:45,350 --> 00:02:43,599
flares of red dwarf stars can help us

62
00:02:46,790 --> 00:02:45,360
better understand the flares produced by

63
00:02:48,550 --> 00:02:46,800

our own sun

64
00:02:51,990 --> 00:02:48,560
they are also of interest because red

65
00:02:54,550 --> 00:02:52,000
dwarf stars are often orbited by planets

66
00:02:56,949 --> 00:02:54,560
some data suggest that 40 percent of red

67
00:02:58,790 --> 00:02:56,959
dwarfs have super earth type planets

68
00:03:00,869 --> 00:02:58,800
orbiting in a habitable zone where

69
00:03:02,710 --> 00:03:00,879
liquid water is possible

70
00:03:05,430 --> 00:03:02,720
if this is true then they are good

71
00:03:06,470 --> 00:03:05,440
candidates for supporting life

72
00:03:08,390 --> 00:03:06,480
however

73
00:03:11,110 --> 00:03:08,400
the habitable zone around a cool dim

74
00:03:14,550 --> 00:03:11,120
star like dgcvn is much closer to the

75
00:03:17,430 --> 00:03:14,560
star than the earth is to the sun

76
00:03:19,670 --> 00:03:17,440
when planets are closer to their star

77
00:03:21,910 --> 00:03:19,680
they're more susceptible to anything the

78
00:03:23,910 --> 00:03:21,920
star does for instance

79
00:03:26,470 --> 00:03:23,920
if the star flares

80
00:03:30,949 --> 00:03:26,480
the planet is much closer to the star

81
00:03:33,750 --> 00:03:30,959
and it can be hit by the radiation

82
00:03:36,869 --> 00:03:33,760
or the particles that get ejected from

83
00:03:40,710 --> 00:03:36,879
the star when this flare process happens

84
00:03:42,710 --> 00:03:40,720
if you happened to be on a planet

85
00:03:44,710 --> 00:03:42,720
around an m dwarf when one of these