
science @

1
00:00:07,909 --> 00:00:05,030
andromeda versus the milky way

2
00:00:11,350 --> 00:00:07,919
astronomers predict a titanic collision

3
00:00:13,270 --> 00:00:11,360
presented by science at nasa

4
00:00:16,470 --> 00:00:13,280
imagine having a galaxy fall on your

5
00:00:18,150 --> 00:00:16,480
head and you survive the experience nasa

6
00:00:20,390 --> 00:00:18,160
astronomers say that's exactly what's

7
00:00:23,509 --> 00:00:20,400
going to happen to our milky way galaxy

8
00:00:25,910 --> 00:00:23,519
approximately 4 billion years from now

9
00:00:27,589 --> 00:00:25,920
new data from the hubble space telescope

10
00:00:29,509 --> 00:00:27,599
confirmed that the milky way is on a

11
00:00:31,830 --> 00:00:29,519
collision course with the great

12
00:00:34,310 --> 00:00:31,840
andromeda galaxy

13
00:00:36,310 --> 00:00:34,320

when the mash-up occurs say researchers

14
00:00:38,229 --> 00:00:36,320
it's likely the sun will be flung into a

15
00:00:40,950 --> 00:00:38,239
new region of our galaxy

16
00:00:43,590 --> 00:00:40,960
but earth and the solar system are in no

17
00:00:45,670 --> 00:00:43,600
danger of being destroyed

18
00:00:47,750 --> 00:00:45,680
after nearly a century of speculation

19
00:00:49,910 --> 00:00:47,760
about the future destiny of andromeda

20
00:00:51,990 --> 00:00:49,920
and our milky way we at last have a

21
00:00:54,470 --> 00:00:52,000
clear picture of how events will unfold

22
00:00:57,430 --> 00:00:54,480
over the coming billions of years says

23
00:01:01,029 --> 00:00:57,440
sangmo tony son of the space telescope

24
00:01:02,549 --> 00:01:01,039
science institute in baltimore maryland

25
00:01:04,149 --> 00:01:02,559
astronomers have long known that

26
00:01:06,230 --> 00:01:04,159
andromeda and the milky way were

27
00:01:08,710 --> 00:01:06,240
converging drawn together by their

28
00:01:10,870 --> 00:01:08,720
mutual pull of gravity and an invisible

29
00:01:13,670 --> 00:01:10,880
dark matter halo that surrounds them

30
00:01:16,070 --> 00:01:13,680
both but no one knew whether the far

31
00:01:19,670 --> 00:01:16,080
future encounter would be a near-miss a

32
00:01:21,350 --> 00:01:19,680
glancing blow or a head-on smash-up

33
00:01:23,429 --> 00:01:21,360
it all depends on the amount of

34
00:01:25,510 --> 00:01:23,439
andromeda's sideways motion

35
00:01:28,230 --> 00:01:25,520
a lot of sideways motion would allow

36
00:01:30,469 --> 00:01:28,240
andromeda to sail wide of the milky way

37
00:01:32,630 --> 00:01:30,479
missing our galaxy entirely

38
00:01:34,310 --> 00:01:32,640

less of it would bring the two galaxies

39
00:01:36,390 --> 00:01:34,320
directly together

40
00:01:38,630 --> 00:01:36,400
the hubble team led by roland van

41
00:01:41,270 --> 00:01:38,640
damerell of the space telescope science

42
00:01:43,350 --> 00:01:41,280
institute conducted extraordinarily

43
00:01:46,630 --> 00:01:43,360
precise observations of the sideways

44
00:01:48,950 --> 00:01:46,640
motion that removes any doubt andromeda

45
00:01:50,950 --> 00:01:48,960
is destined to collide directly and

46
00:01:53,109 --> 00:01:50,960
merge with the milky way

47
00:01:55,590 --> 00:01:53,119
although the two galaxies will plow into

48
00:01:57,990 --> 00:01:55,600
each other stars inside each galaxy are

49
00:01:59,190 --> 00:01:58,000
so far apart that they will not collide

50
00:02:01,429 --> 00:01:59,200
individually

51
00:02:03,830 --> 00:02:01,439
instead the stars will be thrown into

52
00:02:05,830 --> 00:02:03,840
different orbits around a new combined

53
00:02:07,910 --> 00:02:05,840
galactic center

54
00:02:09,910 --> 00:02:07,920
simulations show that our own sun will

55
00:02:12,710 --> 00:02:09,920
probably be tossed much farther from the

56
00:02:15,110 --> 00:02:12,720
galactic core than it is today

57
00:02:17,430 --> 00:02:15,120
team member gertina besla of columbia

58
00:02:19,750 --> 00:02:17,440
university in new york describes what a

59
00:02:21,990 --> 00:02:19,760
head-on collision will be like

60
00:02:23,990 --> 00:02:22,000
the stellar populations of both galaxies

61
00:02:26,630 --> 00:02:24,000
would be jostled and the milky way will

62
00:02:28,869 --> 00:02:26,640
lose its flattened pancake shape

63
00:02:30,949 --> 00:02:28,879

the two galaxies cores will merge and

64
00:02:33,509 --> 00:02:30,959
the stars will settle into randomized

65
00:02:35,270 --> 00:02:33,519
orbits to create a new elliptical shaped

66
00:02:37,270 --> 00:02:35,280
galaxy

67
00:02:39,910 --> 00:02:37,280
to make matters more complicated

68
00:02:43,270 --> 00:02:39,920
andromeda has a companion the triangulum

69
00:02:46,710 --> 00:02:43,280
galaxy also known as m33

70
00:02:48,630 --> 00:02:46,720
m33 is a relatively small galaxy not

71
00:02:51,589 --> 00:02:48,640
nearly as large as andromeda or the

72
00:02:53,670 --> 00:02:51,599
milky way nevertheless it could play a

73
00:02:55,509 --> 00:02:53,680
big role

74
00:02:57,430 --> 00:02:55,519
m-33 will join in the collision and

75
00:02:58,949 --> 00:02:57,440
perhaps later merge with the andromeda

76
00:03:01,589 --> 00:02:58,959
milky way pair

77
00:03:03,750 --> 00:03:01,599
there's even a small chance that m33

78
00:03:05,910 --> 00:03:03,760
might hit the milky way first

79
00:03:08,630 --> 00:03:05,920
amazingly earth and the solar system

80
00:03:10,869 --> 00:03:08,640
should emerge from the melee unscathed

81
00:03:13,190 --> 00:03:10,879
we'll just have a new galactic address

82
00:03:15,030 --> 00:03:13,200
and perhaps a night sky with a double

83
00:03:16,869 --> 00:03:15,040
helping of stars

84
00:03:19,670 --> 00:03:16,879
it turns out that a galaxy falling on

85
00:03:21,830 --> 00:03:19,680
your head isn't so bad after all

86
00:03:23,910 --> 00:03:21,840
for more news about cosmic collisions