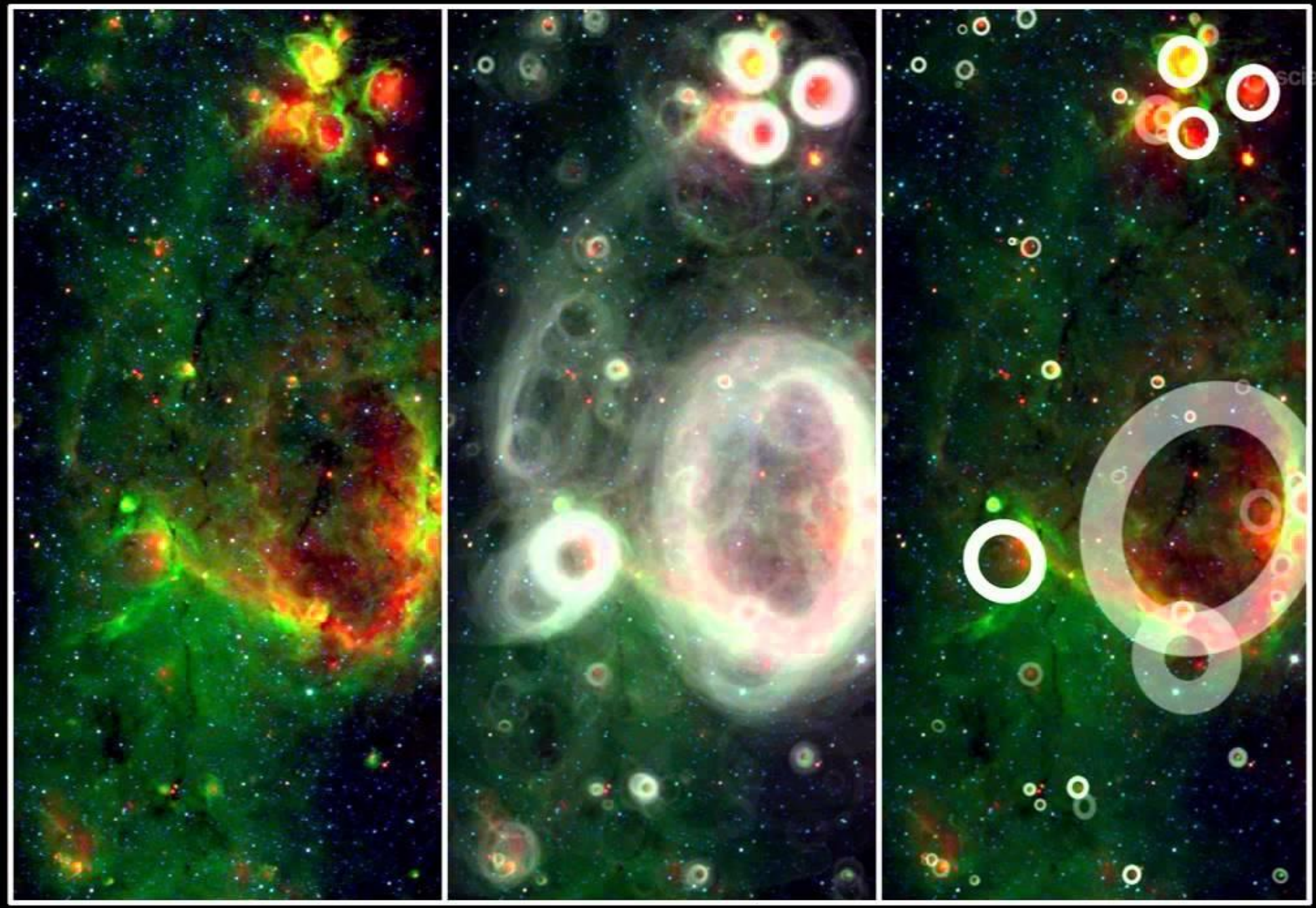
science @ NASA

1
00:00:06,630 --> 00:00:05,590
amateur scientists discover galactic

2
00:00:09,990 --> 00:00:06,640
bubbles

3
00:00:12,310 --> 00:00:10,000
presented by science at nasa

4
00:00:14,549 --> 00:00:12,320
our galaxy gets its name from a luminous

5
00:00:17,189 --> 00:00:14,559
band stretching across the sky on warm

6
00:00:19,429 --> 00:00:17,199
summer nights innumerable stars and

7
00:00:21,590 --> 00:00:19,439
spiral arms blend together to form a

8
00:00:23,269 --> 00:00:21,600
milky river of light that literally cuts

9
00:00:24,950 --> 00:00:23,279
the heavens in two

10
00:00:28,470 --> 00:00:24,960
ancient greeks called it the milky

11
00:00:31,349 --> 00:00:28,480
circle or in classical latin via lactea

12
00:00:33,030 --> 00:00:31,359
the milky way modern sky watchers might

13
00:00:35,270 --> 00:00:33,040

have found a better name though

14
00:00:37,430 --> 00:00:35,280
dom perignon

15
00:00:39,110 --> 00:00:37,440
a team of more than 35 000 amateur

16
00:00:41,110 --> 00:00:39,120
scientists have been looking through

17
00:00:42,229 --> 00:00:41,120
images taken by nasa's spitzer space

18
00:00:44,470 --> 00:00:42,239
telescope

19
00:00:47,270 --> 00:00:44,480
and they have discovered more than 5 000

20
00:00:49,430 --> 00:00:47,280
bubbles in the disk of our galaxy

21
00:00:52,069 --> 00:00:49,440
the milky way's disk is like champagne

22
00:00:54,310 --> 00:00:52,079
with bubbles all over the place says eli

23
00:00:55,830 --> 00:00:54,320
bressert an astrophysics doctoral

24
00:00:57,350 --> 00:00:55,840
student at the european southern

25
00:00:59,110 --> 00:00:57,360
observatory

26
00:01:00,549 --> 00:00:59,120
bressert is a professional astronomer

27
00:01:02,470 --> 00:01:00,559
who has been analyzing data from the

28
00:01:04,630 --> 00:01:02,480
milky way project which harnesses the

29
00:01:06,070 --> 00:01:04,640
power of citizen scientists to explore

30
00:01:07,510 --> 00:01:06,080
space

31
00:01:09,510 --> 00:01:07,520
computers can find these kinds of

32
00:01:11,350 --> 00:01:09,520
structures but none can yet match the

33
00:01:13,750 --> 00:01:11,360
power of the human eye notes robert

34
00:01:16,390 --> 00:01:13,760
simpson of oxford university principal

35
00:01:18,550 --> 00:01:16,400
investigator of the milky way project

36
00:01:20,550 --> 00:01:18,560
humans are particularly good at noticing

37
00:01:22,950 --> 00:01:20,560
the wispy arcs

38
00:01:24,550 --> 00:01:22,960

partially broken rings

39
00:01:25,990 --> 00:01:24,560
and circles within circles of

40
00:01:27,670 --> 00:01:26,000
overlapping bubbles in the crowded

41
00:01:29,350 --> 00:01:27,680
galaxy

42
00:01:31,350 --> 00:01:29,360
the milky way project taps into the

43
00:01:33,109 --> 00:01:31,360
wisdom of crowds by requiring that at

44
00:01:35,910 --> 00:01:33,119
least five people flag a potential

45
00:01:37,830 --> 00:01:35,920
bubble before adding it to the catalog

46
00:01:39,670 --> 00:01:37,840
we have plans to try and use data from

47
00:01:41,590 --> 00:01:39,680
the milky way project to help train

48
00:01:43,270 --> 00:01:41,600
computers to perform this task better at

49
00:01:45,109 --> 00:01:43,280
simpson

50
00:01:47,749 --> 00:01:45,119
interstellar bubbles are a sign of star

51
00:01:49,429 --> 00:01:47,759
formation fast moving winds from young

52
00:01:51,190 --> 00:01:49,439
hot stars blow bubbles into the

53
00:01:52,789 --> 00:01:51,200
surrounding gas and dust from which they

54
00:01:54,789 --> 00:01:52,799
are formed

55
00:01:56,550 --> 00:01:54,799
because stars are born in groups the

56
00:01:57,990 --> 00:01:56,560
bubbles tend to crowd together

57
00:01:59,510 --> 00:01:58,000
overlapping in ways that can trick

58
00:02:01,030 --> 00:01:59,520
computers

59
00:02:02,469 --> 00:02:01,040
people on the other hand are finding

60
00:02:03,590 --> 00:02:02,479
more bubbles than researchers thought

61
00:02:05,350 --> 00:02:03,600
possible

62
00:02:07,190 --> 00:02:05,360
these findings make us suspect that the

63
00:02:09,029 --> 00:02:07,200

milky way is a much more active

64
00:02:11,029 --> 00:02:09,039
star-forming galaxy than previously

65
00:02:13,030 --> 00:02:11,039
thought says bressert

66
00:02:14,869 --> 00:02:13,040
spitzer is an infrared telescope that

67
00:02:16,949 --> 00:02:14,879
can see long distances through the dusty

68
00:02:18,630 --> 00:02:16,959
plane of the milky way

69
00:02:19,510 --> 00:02:18,640
infrared vision is key to the bubble

70
00:02:21,510 --> 00:02:19,520
hunt

71
00:02:23,350 --> 00:02:21,520
star-forming regions are deeply embedded

72
00:02:25,750 --> 00:02:23,360
within dust in the galaxy explained

73
00:02:27,910 --> 00:02:25,760
simpson ordinary visible light has

74
00:02:29,910 --> 00:02:27,920
trouble penetrating these areas

75
00:02:31,430 --> 00:02:29,920
you need infrared or radio wavelengths

76
00:02:33,350 --> 00:02:31,440
to detect them

77
00:02:35,430 --> 00:02:33,360
bubbles are so numerous researchers

78
00:02:37,750 --> 00:02:35,440
suspect they must play an important role

79
00:02:40,070 --> 00:02:37,760
in the evolution of the galaxy

80
00:02:42,470 --> 00:02:40,080
for instance rapidly expanding bubbles

81
00:02:44,550 --> 00:02:42,480
can run into interstellar clouds of gas

82
00:02:46,470 --> 00:02:44,560
triggering bursts of star formations as

83
00:02:49,270 --> 00:02:46,480
the clouds collapse

84
00:02:51,110 --> 00:02:49,280
new stars in turn blow more bubbles

85
00:02:52,869 --> 00:02:51,120
it's a cyclical process that could keep

86
00:02:54,550 --> 00:02:52,879
the milky way fizzing like a gas of the

87
00:02:56,550 --> 00:02:54,560
bubbly

88
00:02:59,030 --> 00:02:56,560

curiously the center of the milky way

89
00:03:00,470 --> 00:02:59,040
seems to be fizzing less than it should

90
00:03:02,830 --> 00:03:00,480
the number of bubbles counted by

91
00:03:05,589 --> 00:03:02,840
volunteers drops off around the galactic

92
00:03:07,030 --> 00:03:05,599
center we would expect star formation to

93
00:03:08,630 --> 00:03:07,040
be peaking in the galactic center

94
00:03:10,390 --> 00:03:08,640
because that's where most of the dense

95
00:03:12,149 --> 00:03:10,400
gas is says bressert

96
00:03:13,430 --> 00:03:12,159
this project is bringing us lots of

97
00:03:14,949 --> 00:03:13,440
questions

98
00:03:17,030 --> 00:03:14,959
anyone who would like to help find the

99
00:03:19,990 --> 00:03:17,040
answers can join the milky way project

100
00:03:22,149 --> 00:03:20,000
at milkywayproject.org