



1
00:00:10,470 --> 00:00:08,230
a star with spiral arms presented by

2
00:00:13,110 --> 00:00:10,480
science at nasa

3
00:00:14,870 --> 00:00:13,120
for more than 400 years astronomers have

4
00:00:17,430 --> 00:00:14,880
used telescopes to study the great

5
00:00:19,189 --> 00:00:17,440
variety of stars in our galaxy

6
00:00:20,310 --> 00:00:19,199
millions of distant suns have been

7
00:00:21,910 --> 00:00:20,320
catalogued

8
00:00:23,269 --> 00:00:21,920
there are dwarf stars

9
00:00:25,830 --> 00:00:23,279
giant stars

10
00:00:27,349 --> 00:00:25,840
dead stars exploding stars

11
00:00:29,589 --> 00:00:27,359
binary stars

12
00:00:31,910 --> 00:00:29,599
by now you might suppose that every kind

13
00:00:33,750 --> 00:00:31,920

of star in the milky way had been seen

14

00:00:35,190 --> 00:00:33,760

that's why a recent discovery is so

15

00:00:37,110 --> 00:00:35,200

surprising

16

00:00:39,270 --> 00:00:37,120

researchers using the subaru telescope

17

00:00:40,630 --> 00:00:39,280

in hawaii have found a star with spiral

18

00:00:45,750 --> 00:00:40,640

arms

19

00:00:50,630 --> 00:00:48,470

we'll call it 462 for short

20

00:00:52,229 --> 00:00:50,640

it's a young star more than 400 light

21

00:00:53,830 --> 00:00:52,239

years from earth in the constellation

22

00:00:56,630 --> 00:00:53,840

lupus the wolf

23

00:00:59,910 --> 00:00:56,640

462 attracted attention because it has a

24

00:01:03,110 --> 00:00:59,920

circumstellar disk that is a broad disk

25

00:01:05,189 --> 00:01:03,120

of dust and gas surrounding the star

26
00:01:07,270 --> 00:01:05,199
researchers strongly suspected that new

27
00:01:09,510 --> 00:01:07,280
planets might be coalescing inside the

28
00:01:11,510 --> 00:01:09,520
disk which is about twice as wide as the

29
00:01:14,149 --> 00:01:11,520
orbit of pluto

30
00:01:17,030 --> 00:01:14,159
when they took a closer look at 462 they

31
00:01:19,670 --> 00:01:17,040
found not planets but arms

32
00:01:21,270 --> 00:01:19,680
astronomers have seen spiral arms before

33
00:01:23,030 --> 00:01:21,280
they're commonly found in pinwheel

34
00:01:25,350 --> 00:01:23,040
galaxies where hundreds of millions of

35
00:01:26,469 --> 00:01:25,360
stars spiral together around a common

36
00:01:28,310 --> 00:01:26,479
core

37
00:01:30,469 --> 00:01:28,320
finding a clear case of spiral arms

38
00:01:32,149 --> 00:01:30,479

around an individual star however is

39

00:01:34,069 --> 00:01:32,159

surprising

40

00:01:36,230 --> 00:01:34,079

the arms might be a sign that planets

41

00:01:38,149 --> 00:01:36,240

are forming within the disk detailed

42

00:01:39,910 --> 00:01:38,159

computer simulations have shown us that

43

00:01:42,469 --> 00:01:39,920

the gravitational pull of a planet

44

00:01:45,190 --> 00:01:42,479

inside a circumstellar disk can perturb

45

00:01:47,429 --> 00:01:45,200

gas and dust creating spiral arms says

46

00:01:49,429 --> 00:01:47,439

carol grady an astronomer with eureka

47

00:01:51,830 --> 00:01:49,439

scientific incorporated who is based at

48

00:01:53,590 --> 00:01:51,840

nasa's goddard space flight center

49

00:01:56,469 --> 00:01:53,600

now for the first time we're seeing

50

00:01:58,389 --> 00:01:56,479

these dynamical features

51
00:02:00,870 --> 00:01:58,399
grady revealed the image to colleagues

52
00:02:03,350 --> 00:02:00,880
on october 19th at a meeting at goddard

53
00:02:05,350 --> 00:02:03,360
entitled signposts of planets

54
00:02:07,510 --> 00:02:05,360
theoretical models show that a single

55
00:02:09,510 --> 00:02:07,520
embedded planet may produce a spiral arm

56
00:02:12,309 --> 00:02:09,520
on each side of a disc

57
00:02:14,390 --> 00:02:12,319
the structures around 462 however do not

58
00:02:17,110 --> 00:02:14,400
form a matched pair suggesting the

59
00:02:18,710 --> 00:02:17,120
presence of two unseen worlds one for

60
00:02:20,790 --> 00:02:18,720
each arm

61
00:02:22,790 --> 00:02:20,800
brady's research is part of a five-year

62
00:02:26,309 --> 00:02:22,800
international study of newborn stars and

63
00:02:27,910 --> 00:02:26,319

planets using the giant 8.2 meter subaru

64

00:02:29,910 --> 00:02:27,920

telescope

65

00:02:31,670 --> 00:02:29,920

operated by the national astronomical

66

00:02:33,670 --> 00:02:31,680

observatory of japan

67

00:02:36,470 --> 00:02:33,680

subaru scans the heavens from a perch

68

00:02:38,710 --> 00:02:36,480

almost 14 000 feet above sea level at

69

00:02:39,990 --> 00:02:38,720

the summit of the hawaiian volcano mauna

70

00:02:41,990 --> 00:02:40,000

kea

71

00:02:43,910 --> 00:02:42,000

from there it has a crystal clear view

72

00:02:45,430 --> 00:02:43,920

of innumerable young stars and their

73

00:02:47,030 --> 00:02:45,440

planet-forming disks throughout the

74

00:02:48,630 --> 00:02:47,040

milky way

75

00:02:50,550 --> 00:02:48,640

what we're finding is that once these

76

00:02:53,030 --> 00:02:50,560

systems reach ages of a few million

77

00:02:55,030 --> 00:02:53,040

years that's young for a star

78

00:02:57,990 --> 00:02:55,040

their discs begin to show all kinds of

79

00:02:59,589 --> 00:02:58,000

interesting shapes says john wisniewski

80

00:03:01,589 --> 00:02:59,599

a collaborator at the university of

81

00:03:04,869 --> 00:03:01,599

washington in seattle

82

00:03:06,390 --> 00:03:04,879

we've seen rings divots gaps and now

83

00:03:08,149 --> 00:03:06,400

spiral features

84

00:03:10,229 --> 00:03:08,159

many of these structures could be caused

85

00:03:12,869 --> 00:03:10,239

by planets moving within the disks

86

00:03:14,630 --> 00:03:12,879

however it is not an open and shut case

87

00:03:16,790 --> 00:03:14,640

the research team cautions that

88

00:03:19,270 --> 00:03:16,800

processes unrelated to planets might

89

00:03:21,110 --> 00:03:19,280

give rise to these structures

90

00:03:22,390 --> 00:03:21,120

until more evidence is collected or

91

00:03:25,270 --> 00:03:22,400

until the planets themselves are

92

00:03:26,789 --> 00:03:25,280

detected they can't be certain

93

00:03:30,149 --> 00:03:26,799

one thing is for sure

94

00:03:32,309 --> 00:03:30,159

the milky way is still full of surprises