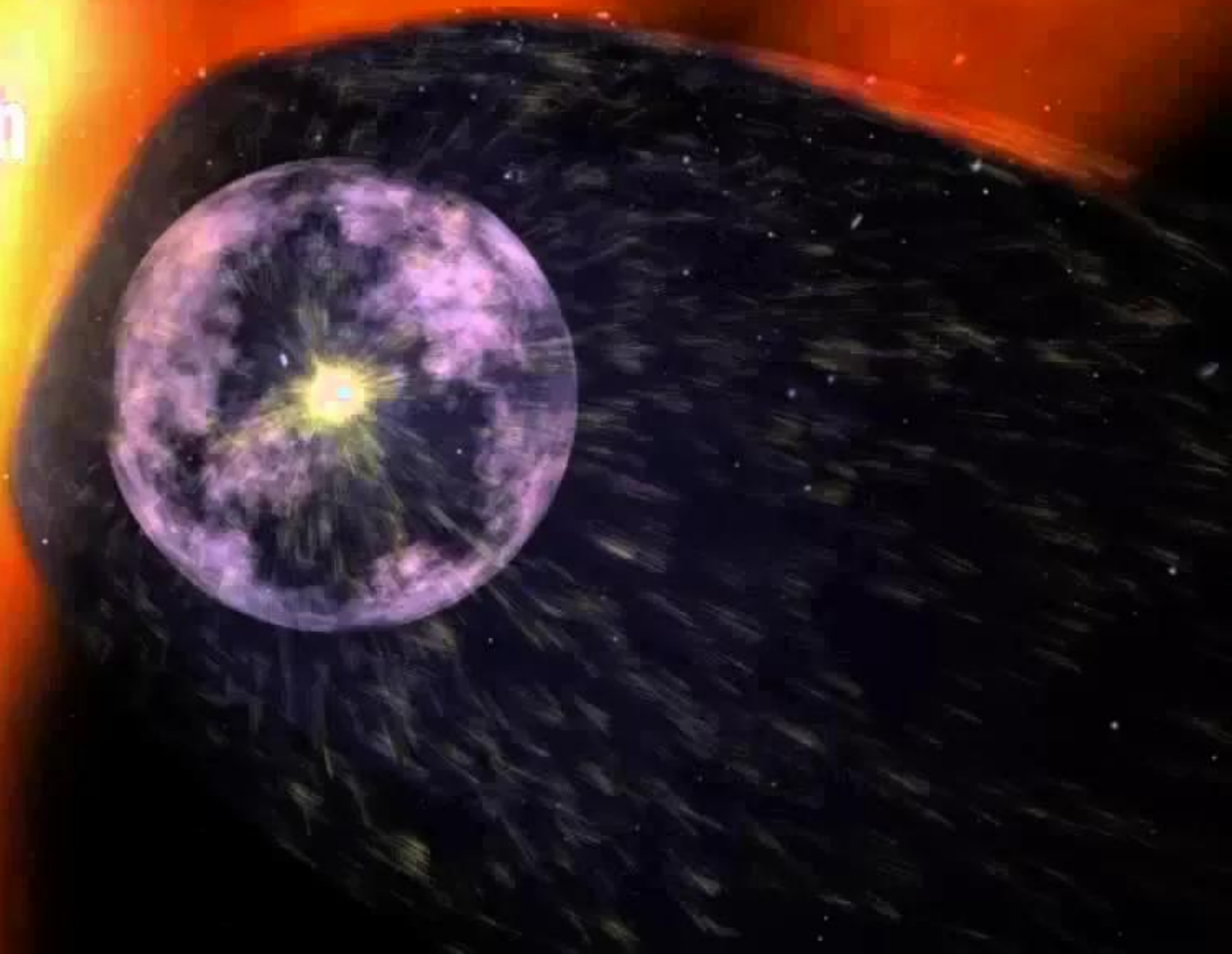


**Galactic Winds**  
**20 Neon - 74 Oxygen**



1  
00:00:05,670 --> 00:00:03,669

[Music]

2  
00:00:08,470 --> 00:00:05,680

alien matter in the solar system a

3  
00:00:10,150 --> 00:00:08,480

galactic mismatch presented by science

4  
00:00:11,430 --> 00:00:10,160

at nasa

5  
00:00:13,190 --> 00:00:11,440

this just in

6  
00:00:15,829 --> 00:00:13,200

the solar system is different from the

7  
00:00:17,109 --> 00:00:15,839

space just outside it

8  
00:00:20,230 --> 00:00:17,119

announced the finding at a press

9  
00:00:22,230 --> 00:00:20,240

conference on january 31st 2012

10  
00:00:24,230 --> 00:00:22,240

it's based on data from nasa's ibex

11  
00:00:26,070 --> 00:00:24,240

spacecraft which is able to sample

12  
00:00:28,630 --> 00:00:26,080

material flowing into the solar system

13  
00:00:30,470 --> 00:00:28,640

from interstellar space

14

00:00:32,310 --> 00:00:30,480

we've detected alien matter that came

15

00:00:34,389 --> 00:00:32,320

into our solar system from other parts

16

00:00:36,389 --> 00:00:34,399

of the galaxy and chemically speaking

17

00:00:38,869 --> 00:00:36,399

it's not exactly like what we find here

18

00:00:40,869 --> 00:00:38,879

at home says david mcomas the principal

19

00:00:43,990 --> 00:00:40,879

investigator for ibex at the southwest

20

00:00:45,830 --> 00:00:44,000

research institute in san antonio texas

21

00:00:47,750 --> 00:00:45,840

our solar system is surrounded by a

22

00:00:49,350 --> 00:00:47,760

magnetic bubble called the heliosphere

23

00:00:50,869 --> 00:00:49,360

that separates us from the rest of the

24

00:00:52,869 --> 00:00:50,879

milky way

25

00:00:55,750 --> 00:00:52,879

outside the heliosphere lies the realm

26

00:00:58,389 --> 00:00:55,760

of the stars or interstellar space

27

00:01:00,709 --> 00:00:58,399

inside lies the sun and all the planets

28

00:01:02,709 --> 00:01:00,719

the sun blows this vast magnetic bubble

29

00:01:04,630 --> 00:01:02,719

using the solar wind to inflate the

30

00:01:06,149 --> 00:01:04,640

sun's own magnetic field

31

00:01:07,990 --> 00:01:06,159

it's a good thing

32

00:01:09,750 --> 00:01:08,000

the heliosphere helps protect us from

33

00:01:12,149 --> 00:01:09,760

cosmic rays that would otherwise

34

00:01:14,870 --> 00:01:12,159

penetrate the solar system

35

00:01:16,950 --> 00:01:14,880

launched in 2008 the ibex spacecraft

36

00:01:18,710 --> 00:01:16,960

spins in earth's orbit scanning the

37

00:01:20,630 --> 00:01:18,720

entire sky

38

00:01:22,230 --> 00:01:20,640

ibex's special trick is detecting

39

00:01:24,710 --> 00:01:22,240

neutral atoms that slip through the

40

00:01:26,390 --> 00:01:24,720

heliosphere's magnetic defenses

41

00:01:28,950 --> 00:01:26,400

without actually exiting the solar

42

00:01:30,310 --> 00:01:28,960

system ibex is able to sample the galaxy

43

00:01:31,910 --> 00:01:30,320

outside

44

00:01:33,990 --> 00:01:31,920

the first two years of counting these

45

00:01:35,510 --> 00:01:34,000

alien atoms have led to some interesting

46

00:01:37,429 --> 00:01:35,520

conclusions

47

00:01:39,590 --> 00:01:37,439

we've directly measured four separate

48

00:01:41,270 --> 00:01:39,600

types of atoms from interstellar space

49

00:01:43,109 --> 00:01:41,280

and the composition just doesn't match

50

00:01:45,109 --> 00:01:43,119

up with what we see in the solar system

51  
00:01:47,190 --> 00:01:45,119  
says eric christian mission scientist

52  
00:01:49,190 --> 00:01:47,200  
for ibex at nasa's goddard space flight

53  
00:01:50,870 --> 00:01:49,200  
center in greenbelt maryland

54  
00:01:53,030 --> 00:01:50,880  
in a series of six science papers

55  
00:01:55,670 --> 00:01:53,040  
appearing in the astrophysical journal

56  
00:01:58,069 --> 00:01:55,680  
the ibex team reported that for every 20

57  
00:02:00,469 --> 00:01:58,079  
neon atoms in the galactic wind there

58  
00:02:02,469 --> 00:02:00,479  
are 74 oxygen atoms

59  
00:02:05,590 --> 00:02:02,479  
in our own solar system however for

60  
00:02:06,630 --> 00:02:05,600  
every 20 neon atoms there are 111 oxygen

61  
00:02:08,710 --> 00:02:06,640  
atoms

62  
00:02:10,790 --> 00:02:08,720  
that translates to more oxygen in any

63  
00:02:13,110 --> 00:02:10,800

given slice of the solar system than in

64

00:02:15,670 --> 00:02:13,120

local interstellar space

65

00:02:17,190 --> 00:02:15,680

where did the extra oxygen come from

66

00:02:18,710 --> 00:02:17,200

there are at least two possibilities

67

00:02:20,390 --> 00:02:18,720

sesame commas

68

00:02:22,309 --> 00:02:20,400

either the solar system evolved in a

69

00:02:24,790 --> 00:02:22,319

separate more oxygen-rich part of the

70

00:02:26,710 --> 00:02:24,800

galaxy than where we currently reside or

71

00:02:28,949 --> 00:02:26,720

a great deal of critical life-giving

72

00:02:31,270 --> 00:02:28,959

oxygen lies trapped in interstellar dust

73

00:02:33,430 --> 00:02:31,280

grains or ices unable to move freely

74

00:02:35,270 --> 00:02:33,440

throughout space and thus undetectable

75

00:02:37,430 --> 00:02:35,280

by ibex

76

00:02:39,750 --> 00:02:37,440

either way this affects scientific

77

00:02:42,550 --> 00:02:39,760

models of how our solar system and life

78

00:02:44,710 --> 00:02:42,560

formed it's a real puzzle

79

00:02:47,190 --> 00:02:44,720

while ibex samples alien atoms from

80

00:02:48,710 --> 00:02:47,200

earth's orbit nasa's voyager spacecraft

81

00:02:51,509 --> 00:02:48,720

have been traveling to the edge of the

82

00:02:52,949 --> 00:02:51,519

heliosphere for nearly 40 years and they

83

00:02:54,869 --> 00:02:52,959

could soon find themselves on the

84

00:02:57,110 --> 00:02:54,879

outside looking in

85

00:02:59,830 --> 00:02:57,120

researchers expect voyager 1 to exit the

86

00:03:01,750 --> 00:02:59,840

solar system within the next few years

87

00:03:03,750 --> 00:03:01,760

the new data from ibex suggests the

88

00:03:05,030 --> 00:03:03,760

voyagers are heading for a new frontier

89

00:03:06,710 --> 00:03:05,040

indeed