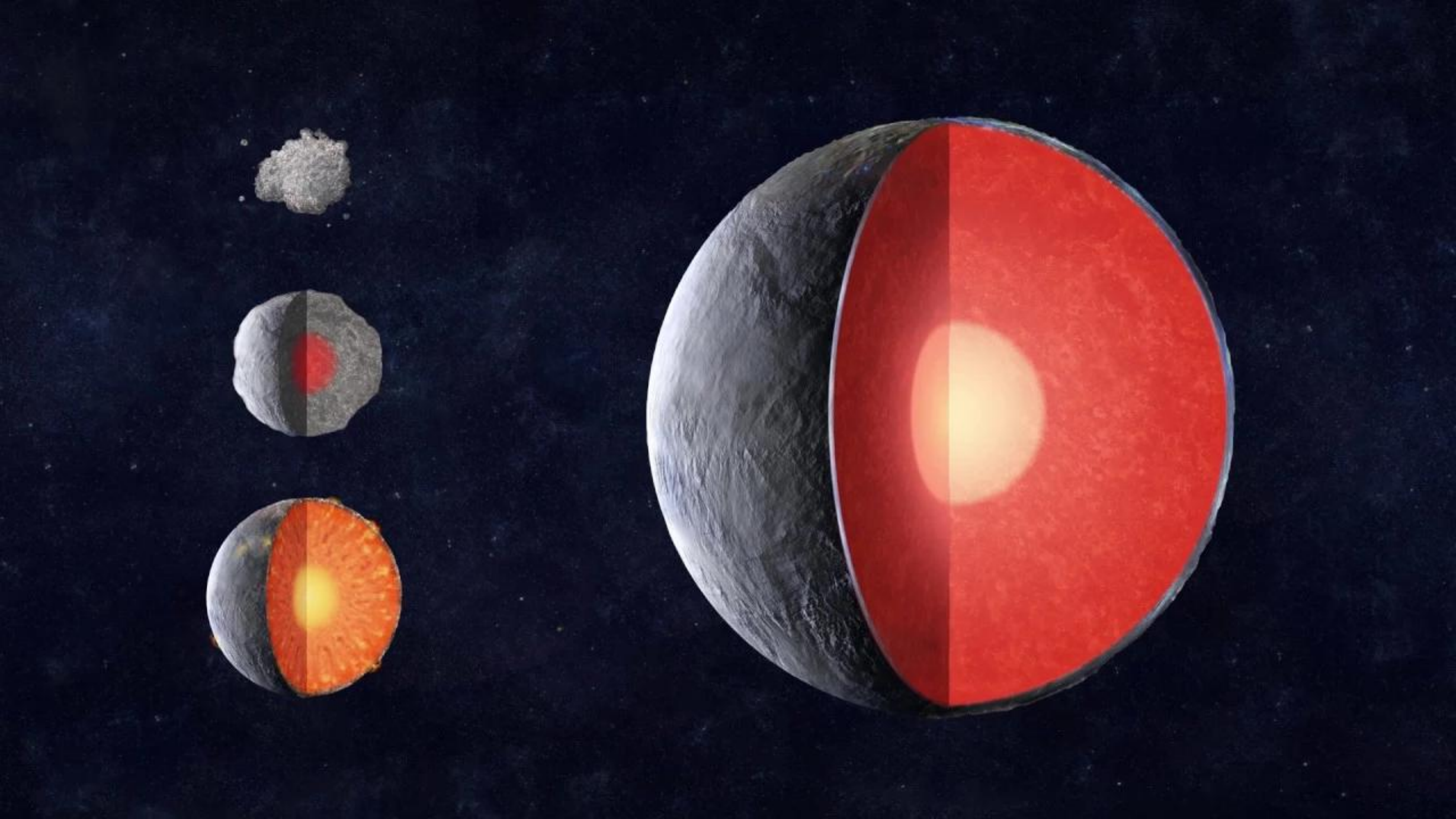

1
00:00:00,417 --> 00:00:03,662
■

2
00:00:04,200 --> 00:00:07,612
It's a shame, but living
in the city, very rarely

3
00:00:07,612 --> 00:00:10,387
do you get to see stars.

4
00:00:10,698 --> 00:00:14,127
- I feel like I have a
new connection to them

5
00:00:14,127 --> 00:00:16,075
in a way that I
haven't before.

6
00:00:16,075 --> 00:00:17,526
- If I'm out in the
desert and I look up

7
00:00:17,526 --> 00:00:20,252
at the sky, you just
see millions and millions

8
00:00:20,252 --> 00:00:22,470
of places that we
should be going.

9
00:00:22,470 --> 00:00:25,534
- It's almost baked into
our DNA the desire to

10
00:00:25,534 --> 00:00:27,431
go and explore, right?
That's the whole reason

11
00:00:27,431 --> 00:00:30,022

why we left the forest
and then traveled across

12
00:00:30,022 --> 00:00:32,147
oceans, just to see
what's out there.

13
00:00:32,147 --> 00:00:34,655
- I was born in 1969,
which is the year we

14
00:00:34,655 --> 00:00:38,915
landed on the moon.
So, I am a space baby.

15
00:00:39,775 --> 00:00:41,778
- When I was a kid,
there were guys driving

16
00:00:41,778 --> 00:00:45,209
cars on the moon. They're
driving cars on the moon.

17
00:00:45,209 --> 00:00:48,225
That's so cool, right?
I wanna do that.

18
00:00:48,225 --> 00:00:51,221
- All the rocky planets
that we know of all have

19
00:00:51,221 --> 00:00:54,548
got a metal core in their
center, and, especially

20
00:00:54,548 --> 00:00:56,465
for the Earth it's the
source of our magnetic

21
00:00:56,465 --> 00:00:59,616

field. We don't know a lot
about our core, what we've

22
00:00:59,616 --> 00:01:01,544
learned about it we've
learned indirectly,

23
00:01:01,544 --> 00:01:02,839
because we can't go there.

24
00:01:02,839 --> 00:01:04,612
- It's too hot. The
pressure's too high, our

25
00:01:04,612 --> 00:01:06,519
instruments would melt.
Can't drill a hole that

26
00:01:06,519 --> 00:01:09,805
deep in the Earth or other
planets. Turns out, we can

27
00:01:09,805 --> 00:01:12,914
study a planetary core out
in space because there's

28
00:01:12,914 --> 00:01:15,909
this one object, there's
one object, called Psyche.

29
00:01:15,909 --> 00:01:18,988
- 16 Psyche is an
asteroid that orbits the

30
00:01:18,988 --> 00:01:21,155
sun out between
Mars and Jupiter.

31
00:01:21,155 --> 00:01:24,150
It is the only asteroid

that we are aware of, that

32
00:01:24,150 --> 00:01:29,343
is 95% metal or more, and
is really huge. It's about

33
00:01:29,343 --> 00:01:31,789
200 kilometers across
in one axis.

34
00:01:31,789 --> 00:01:34,287
- So, it's about the size
of Massachusetts.

35
00:01:34,287 --> 00:01:37,738
- It's believed that it
may be a remnant, core of

36
00:01:37,738 --> 00:01:40,008
an early planetesimal that
was formed in the very,

37
00:01:40,008 --> 00:01:41,905
very earliest parts
of the formation

38
00:01:41,905 --> 00:01:42,952
of the solar system.

39
00:01:42,952 --> 00:01:45,398
- And, after this planet
started forming, and this

40
00:01:45,398 --> 00:01:47,844
metal core formed inside
of that, it collided with

41
00:01:47,844 --> 00:01:50,362
other bodies that then
stripped off the rocky

42
00:01:50,362 --> 00:01:53,140
mantle, leaving this
core in place.

43
00:01:54,643 --> 00:01:56,405
- The first thing that
came, actually, was the

44
00:01:56,405 --> 00:01:59,680
theory. Some people from
Jet Propulsion Laboratory

45
00:01:59,680 --> 00:02:02,230
contacted me and said,
"We would like to plan a

46
00:02:02,230 --> 00:02:05,360
mission that would
test your hypothesis."

47
00:02:05,360 --> 00:02:08,926
- And that starts you down
a road that takes years.

48
00:02:08,926 --> 00:02:13,351
So we wrote a proposal to
send a NASA spacecraft to

49
00:02:13,351 --> 00:02:16,709
visit this, this big ball
of metal. And then about

50
00:02:16,709 --> 00:02:19,767
a year ago, Lindy gets
a phone call. "You win!"

51
00:02:19,767 --> 00:02:22,275
"Ahhh!" And then we're all
like, "Oh my god, now

52
00:02:22,275 --> 00:02:23,737
we have to do it."

53
00:02:24,690 --> 00:02:26,763
- Psyche gives us the
opportunity to visit a

54
00:02:26,763 --> 00:02:29,344
core, the only way that
humankind can ever do,

55
00:02:29,344 --> 00:02:31,282
and it will be the first
metal object that

56
00:02:31,282 --> 00:02:33,013
humankind has
ever visited.

57
00:02:33,013 --> 00:02:37,014
- We've been approved to
go in August of 2022.

58
00:02:37,014 --> 00:02:39,118
So, we talked with our
mission design and

59
00:02:39,118 --> 00:02:41,605
navigation team and, in
fact, they were able to

60
00:02:41,605 --> 00:02:43,989
come up with what is
probably the most optimal

61
00:02:43,989 --> 00:02:46,466
trajectory, doing a
Mars flyby.

62
00:02:47,752 --> 00:02:50,633
- Flies past Mars, gives
us a gravity assist, uses

63
00:02:50,633 --> 00:02:53,463
that propulsion system to
then slowly creep up

64
00:02:53,463 --> 00:02:58,529
towards the end of 2025,
getting there in early 2026.

65
00:03:02,242 --> 00:03:05,403
- SSL is building the
solar electric propulsion

66
00:03:05,403 --> 00:03:09,497
chassis. When we do the
mechanical, physical,

67
00:03:09,497 --> 00:03:11,528
integration of each
instrument on the

68
00:03:11,528 --> 00:03:14,617
spacecraft, we'll work
hand-in-hand with each of

69
00:03:14,617 --> 00:03:17,426
the providers to get out
to Psyche and do a

70
00:03:17,426 --> 00:03:18,815
full discovery mission.

71
00:03:18,815 --> 00:03:21,738
- We've figured out a way
for many, many people to

72

00:03:21,738 --> 00:03:24,785
build something together
so complicated no one

73
00:03:24,785 --> 00:03:27,127
person can understand it,
but it all has to work

74
00:03:27,127 --> 00:03:29,832
together perfectly for
decades, without fail.

75
00:03:29,832 --> 00:03:32,133
- Just the fact that these
things work at all is a

76
00:03:32,133 --> 00:03:35,212
thrill. It's just a
testament to the engineers

77
00:03:35,212 --> 00:03:38,311
at JPL and the companies
that we collaborate with

78
00:03:38,311 --> 00:03:40,280
that they can
build these things.

79
00:03:40,280 --> 00:03:44,010
- It's exciting for me to
be able to me a woman

80
00:03:44,010 --> 00:03:46,933
winning and leading a deep
space mission. The only

81
00:03:46,933 --> 00:03:50,619
previous woman who
competed, won, and led a

82

00:03:50,619 --> 00:03:53,417
deep space mission was
Maria Zuber, who was my

83
00:03:53,417 --> 00:03:58,610
friend and mentor at MIT.
And so my drive is to make

84
00:03:58,610 --> 00:04:01,927
everyone feel welcome, and
to have every voice heard.

85
00:04:01,927 --> 00:04:03,958
We want as many
undergraduates as we can.

86
00:04:03,958 --> 00:04:06,176
We want to involve as much
as of the public as we can.

87
00:04:06,176 --> 00:04:09,120
We want people to feel
like this is their mission.

88
00:04:09,120 --> 00:04:11,406
- You get that first
picture back, and you

89
00:04:11,406 --> 00:04:12,671
know, one of the first
things that goes through

90
00:04:12,671 --> 00:04:14,298
your mind is "Oh, thank
god I didn't leave the

91
00:04:14,298 --> 00:04:18,247
lens cap on." We will put
our pictures out there as

92

00:04:18,247 --> 00:04:22,859
soon as they come down.
So, we'll discover at the

93
00:04:22,859 --> 00:04:24,611
same time that the public
discovers. We'll be

94
00:04:24,611 --> 00:04:26,788
scratching our heads and
it's like, "I don't know

95
00:04:26,788 --> 00:04:28,394
what's going on," at the
same time everybody else

96
00:04:28,394 --> 00:04:29,876
is like, "Wow, what is
that?" I don't know,

97
00:04:29,876 --> 00:04:31,804
let's figure it out.

98
00:04:32,820 --> 00:04:36,002
- I did get to look at
Psyche through an optical

99
00:04:36,002 --> 00:04:38,893
telescope in my backyard.
Some wonderful colleagues

100
00:04:38,893 --> 00:04:41,080
brought over their
telescope on a fortuitous

101
00:04:41,080 --> 00:04:44,936
night. It's a very, very
tiny faint dot, and that

102
00:04:44,946 --> 00:04:47,994

made a bunch of us cry, to
think that we could send

103
00:04:47,994 --> 00:04:50,948
something to investigate
that speck of light.

104
00:04:50,948 --> 00:04:53,290
- We can understand this
universe that we live in.

105
00:04:53,290 --> 00:04:56,658
We can explore it, we can
learn about it, and we can

106
00:04:56,658 --> 00:04:58,565
be a part of something
which is much bigger than

107
00:04:58,565 --> 00:05:00,742
just us or just this
planet. We'll see new