1
00:00:08,780 --> 00:00:06,440
using nasa's spitzer space telescope

2
00:00:12,350 --> 00:00:08,790
we've looked at many nearby stars to

3
00:00:14,900 --> 00:00:12,360
look for orbiting dust and asteroids and

4
00:00:17,870 --> 00:00:14,910
comets orbiting debris leftover from the

5
00:00:19,639 --> 00:00:17,880
process of planet formation we saw

6
00:00:21,800 --> 00:00:19,649
something very unusual that we hadn't

7
00:00:25,790 --> 00:00:21,810
seen around any other star we saw

8
00:00:27,950 --> 00:00:25,800
evidence for a massive collision when

9
00:00:31,130 --> 00:00:27,960
the two objects collide everything

10
00:00:33,200 --> 00:00:31,140
happens very quickly in the animation

11
00:00:35,840 --> 00:00:33,210
things have been slowed down to allow

12
00:00:38,510 --> 00:00:35,850
you to see the impacting shockwave

13
00:00:41,650 --> 00:00:38,520

propagate across the surface of this

14
00:00:43,720 --> 00:00:41,660
devastated planet

15
00:00:46,150 --> 00:00:43,730
starting from the point of impact and

16
00:00:49,240 --> 00:00:46,160
circulate into the backside causing

17
00:00:51,730 --> 00:00:49,250
waves on the surface the entire planet

18
00:00:53,560 --> 00:00:51,740
becomes molten meanwhile tremendous

19
00:00:55,690 --> 00:00:53,570
amounts of material are ejected from the

20
00:00:57,640 --> 00:00:55,700
planet both outside of the system and

21
00:00:59,560 --> 00:00:57,650
some falls back under the system itself

22
00:01:01,810 --> 00:00:59,570
depending on the details of the

23
00:01:03,729 --> 00:01:01,820
collision whether it's a high impact or

24
00:01:06,580 --> 00:01:03,739
depending on the angle that the objects

25
00:01:09,130 --> 00:01:06,590
at each other at there there may be a

26
00:01:11,020 --> 00:01:09,140
growth or there may be grinding away so

27
00:01:12,760 --> 00:01:11,030
sometimes the planet actually ends up

28
00:01:14,890 --> 00:01:12,770
smaller after the collision but

29
00:01:16,780 --> 00:01:14,900
generally the planet grows to larger and

30
00:01:20,310 --> 00:01:16,790
larger until there's no more material

31
00:01:23,890 --> 00:01:20,320
left in the system for it to grow from

32
00:01:26,140 --> 00:01:23,900
while collisions like this are rare we

33
00:01:27,880 --> 00:01:26,150
don't see this large event in any other

34
00:01:30,550 --> 00:01:27,890
systems we've looked at with the spitzer

35
00:01:33,400 --> 00:01:30,560
space telescope collisions like this

36
00:01:34,900 --> 00:01:33,410
have happened in our own solar system so

37
00:01:36,940 --> 00:01:34,910
there was a large collision that formed

38
00:01:39,190 --> 00:01:36,950

our own moon early on as our planets

39
00:01:40,900 --> 00:01:39,200
formed similarly there are collisions

40
00:01:42,700 --> 00:01:40,910
like this that stripped the mantle off

41
00:01:45,100 --> 00:01:42,710
of the planet Mercury and maybe another

42
00:01:48,580 --> 00:01:45,110
similar large collision Tilted Uranus

43
00:01:50,430 --> 00:01:48,590
onto its side events like this events

44
00:01:52,840 --> 00:01:50,440
that we see around this other star and

45
00:01:55,960 --> 00:01:52,850
events that formed our own moon