



1  
00:00:00,070 --> 00:00:05,160

[Music]

2  
00:00:05,160 --> 00:00:11,270

This computer simulation shows two supermassive black holes orbiting each other.

3  
00:00:11,270 --> 00:00:17,490

It's helping scientists learn what kind of light a real black hole binary system might produce.

4  
00:00:17,490 --> 00:00:21,600

[Music]

5  
00:00:21,600 --> 00:00:24,720

An outer ring of gas surrounds the whole system,

6  
00:00:24,720 --> 00:00:27,840

and a mini disk surrounds each black hole.

7  
00:00:27,840 --> 00:00:30,970

Streams of gas connect the disks.

8  
00:00:30,970 --> 00:00:34,060

[Music]

9  
00:00:34,060 --> 00:00:38,200

Magnetic and gravitational forces heat up the gas,

10  
00:00:38,200 --> 00:00:47,400

Producing UV and X-ray light.

11  
00:00:47,400 --> 00:00:49,470

[Music]

12  
00:00:49,470 --> 00:00:53,550

The amount of gas flowing in the system

13  
00:00:53,550 --> 00:00:57,530

and our viewing angle

14

00:00:57,530 --> 00:01:00,640

[Music]

15

00:01:00,640 --> 00:01:03,770

can alter what we'll see.

16

00:01:03,770 --> 00:01:05,930

[Music]

17

00:01:05,930 --> 00:01:10,000

Intense gravity bends space-time.

18

00:01:10,000 --> 00:01:15,110

The light follows a warped path and is distorted, as with a lens.

19

00:01:15,110 --> 00:01:22,290

[Music]

20

00:01:22,290 --> 00:01:27,350

This also creates an "eyebrow" next to one black hole

21

00:01:27,350 --> 00:01:32,430

caused by light from glowing gas immediately outside the other.

22

00:01:32,430 --> 00:01:34,600

[Music]

23

00:01:34,600 --> 00:01:40,760

Scientists haven't yet seen a supermassive black hole merger,

24

00:01:40,760 --> 00:01:46,880

but simulations like this are preparing them for what they'll find.

25

00:01:59,210 --> 00:01:53,010

[Music]

26

00:01:59,210 --> 00:02:03,230

NASA Astrophysics