

Does it matter the Moon is moving away from us?

Presented by Dr Maggie Aderin-Pocock

Step 3 - How we know the Moon is on the move

Dr Maggie Aderin-Pocock:

Besides having a lot of fun on the Moon, the Apollo astronauts were running a series of scientific experiments.

And on three of the missions they left behind retro-reflector units, packed with small mirrors. This one's from Apollo 15.

And ever since, astronomers have been firing lasers at them, to keep track of exactly how far away the Moon is.

Dr Russet McMillan:

So once we're all centred up on Apollo 15, I can open the shutter and we're ready to shine the laser.

Dr Maggie Aderin-Pocock:

Dr Russet McMillan carries out the laser ranging at Apache Point. So you're now sending pulses of laser-light out towards the Moon.

Dr Russet McMillan:

That's right, they're going to travel to the Moon, get reflected, come back, and get detected by our detector.

Dr Maggie Aderin-Pocock:

So how much of the light do we actually get back?

Dr Russet McMillan:

Well, we're sending out about 100 quadrillion photons with each pulse. If we're lucky, for each pulse we might get back one photon.

Dr Maggie Aderin-Pocock:

One photon back?

Dr Russet McMillan:

One photon out of 100 quadrillion going out.

Dr Maggie Aderin-Pocock:

A photon is a tiny particle of light and 100 quadrillion is...a phenomenally large number! But by capturing just a few photons, it's possible to measure the distance between the Earth and the Moon down to the last millimetre.

Dr Russet McMillan:

As of right now, the distance to the Moon is 393,499km, 257m and 798mm...precisely!

Dr Maggie Aderin-Pocock:

Astronomers have been using lasers to measure the Moon's distance for nearly 40 years now.

And what they're finding amongst all those photons, is a very clear pattern. The Moon, which has been drifting away from us for billions of years, is still drifting, at a speed of 3.78 cm a year.

In human terms that's about the same speed that our finger nails grow.