

## **Rare transit of Mercury to take place on 9 May**

April 28 2016





The transit of Mercury of November 2006. Mercury appears as a small circle in the lower half of the image, and has quite a different appearance to the sunspot groups on the right and left hand limbs of the Sun. Credit: TheBrockenInAGlory

On 9 May there will be a rare transit of Mercury, when the smallest planet in our Solar System will pass directly between the Earth and the Sun. The last time this happened was in 2006, and the next two occasions will be in 2019 and 2032. During the transit, which takes place in the afternoon and early evening in the UK, Mercury will appear as a dark silhouetted disk against the bright surface of the Sun.

From the UK the transit begins at 1112 GMT (1212 BST), when the limb of Mercury appears to touch the limb of the Sun, and ends at 1842 GMT (1942 BST) when the limb of the silhouetted planet appears to leave the Sun. Observers in different locations will see the transit taking place at a slightly different time, as the planet will appear to take a slightly different path across the Sun.

The entire event is visible from most of Western Europe, the western part of North and West Africa, the eastern part of North America and most of South America. Most of the transit (either ending with sunset or starting at sunrise) will be visible from the rest of North and South America, the eastern half of the Pacific, the rest of Africa and most of Asia. Observers in eastern Asia, south-eastern Asia and Australasia will not be able to see the transit.

Mercury completes each orbit around the Sun every 88 days, and passes between the Earth and Sun every 116 days. As the orbit of Mercury around the Sun is tilted compared with the orbit of the Earth around the Sun, the planet normally appears to pass above or below our nearest star. A transit can only take place when the Earth, Mercury and the Sun are



exactly in line in three dimensions.



A map of the global visibility of the transit of Mercury of 9 May 2016. Most of Western Europe, including the UK, is well placed to observe the event this time. Credit: F. Espenak / eclipsewise.com

There are 13 or 14 transits of Mercury each century, so they are comparatively rare events, though each one can typically be seen over a large area of the Earth's surface. A transit was first seen in 1631, two decades after the invention of the telescope, by French astronomer Pierre Gassendi. The most recent transit of Mercury visible in the UK was in 2003 (the 2006 event was visible in the western hemisphere), which was followed by even rarer transits of Venus in 2004 and 2012.

At any time, Mercury blocks out no more than a tiny part of the light from the Sun. This means that the event should NOT be viewed with the



unaided eye. Looking at the Sun without appropriate protection, either during the transit, or at any other time, can cause serious and permanent damage to the eyes.

Astronomical societies have produced online guides on how to safely view the transit, for example by projecting the solar image with binoculars or a telescope. Mercury is too small to be visible using the pinhole projectors that worked successfully in the solar eclipse in March last year.

On the morning of 9 May, UK amateur astronomical societies and public observatories will be running events where members of the public can safely enjoy the transit. The Royal Astronomical Society will be running a (free) event outside our headquarters in the courtyard of Burlington House, central London, where members of the public can come and view the transit using appropriate equipment at no cost.

Observers with access to a moderate-sized telescope with an appropriate safe filter should be able to see Mercury as a dark disk, comparable in apparent size to a sunspot, but somewhat darker. At the beginning and end of the transit, when Mercury's limb is close to the edge of the Sun, it may also be possible to see the 'black drop' effect, where a broad line appears to connect the planet to the solar limb. This is thought to result from the quality of the telescope in use, and turbulence in the Earth's atmosphere (so-called 'seeing'), and has in the past compromised efforts to record transit times.

Professor Martin Barstow, President of the Royal Astronomical Society, is keen for people to experience the transit for themselves. "It is always exciting to see rare astronomical phenomena, such as this <u>transit</u> of Mercury. They show that astronomy is a science that is accessible to everyone, and I would encourage you to take a look if the weather is clear... but do follow the safety advice!"



As it is so close to the Sun, Mercury is difficult to study in detail using telescopes on Earth. Two NASA space probes have visited Mercury, Mariner 10 in 1974 and 1975, and MESSENGER, which orbited the planet from 2011 until a deliberate crash landing in 2015. The European Space Agency mission BepiColombo will launch next year, and is expected to study the planet from 2024 onwards. UK scientists are making a significant contribution to this project.

Transit techniques are also deployed outside our Solar system, and missions like Kepler have used it to confirm the presence of more than 1,000 planets in orbit around other stars. The same technique will be used by the European Space Agency's PLATO mission, expected to launch in 2024.

Provided by Royal Astronomical Society

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