

Computer model shows moon's core surrounded by liquid and it's caused by Earth's gravity

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The image of the moon is courtesy of NASA.

(Phys.org) —A team of researchers with team members from China, the U.S. and Japan has created a computer model that shows that the moon is not solid all the way through—instead, it shows a liquid layer surrounding the core. In their paper published in the journal *Nature Geoscience*, the team suggests the liquid layer, if it's really there, is caused by friction due to Earth's gravity.

Scientists have noted anomalies in measurements of the [moon](#)'s orbit and associated gravitational readings for some time. Such anomalies have

defied explanation, however, as models built to replicate them have generally produced results that weren't very clear. At root however, has been the idea that the moon's core may be covered by a thin layer of liquid. The team noted that gravitational readings of the moon indicate that there is rotation at the core that is not the same as other rotation measurements near the core. This suggests a liquid outer layer.

To get a better idea of what might be going on at the moon's center, the researchers built a computer model that takes into account the gravity exerted by the moon, the earth and the sun. When set into motion, the model showed that a liquid layer over the core gave the same gravity readings as scientists have found when measuring the real moon. This suggests, the team reports, that a liquid layer does truly exist, and likely has been there for a very long time.

As for why such a layer would exist, the team suggests that the tug of Earth's gravity—tidal heating—is likely playing a role, causing friction between the core and material above it, resulting in the creation and maintenance of a liquid layer.

A lot more research will have to be done, of course, before scientists accept the results of the [computer model](#). But if such research should prove that there is a liquid layer, scientists might have to do some rethinking of theories that describe the origin of the moon. If the moon was created due to a large body striking Earth, why did it not cool down over the four and half billion years since then, to the extent that it would be too cold for a liquid layer to exist today?

More information: *Nature Geoscience* (2014) [DOI: 10.1038/ngeo2211](https://doi.org/10.1038/ngeo2211)

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