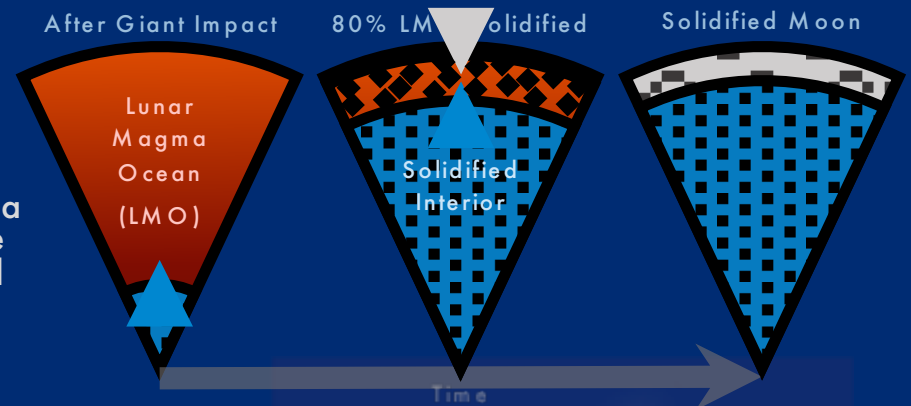


Effect of Re-impacting Debris on the Solidification of the Lunar Magma Ocean

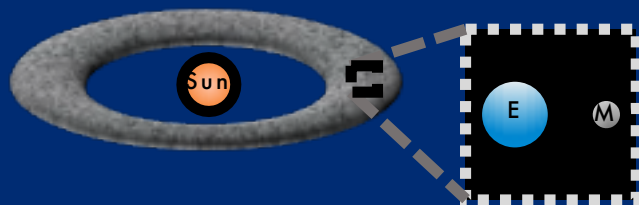
The Moon likely formed from debris generated after a giant impact between the proto-Earth and another planetary body.



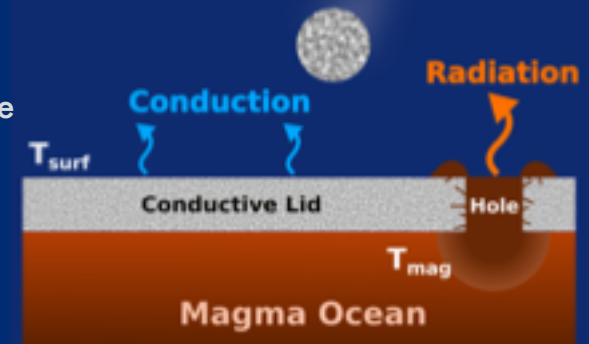
The Moon would have formed as a mostly molten body. After 80% of the magma ocean had rapidly solidified (~1,000 years), a flotation crust would have started to form and slowed the remaining solidification (~10s millions years).



After the giant impact, some debris (about a lunar mass) had sufficient speed to escape the Earth-Moon system and go into heliocentric orbits.



Re-impacting debris could have punctured holes into the crust and sped up the ordinarily slow solidification. They may have also imparted thermal energy and further slowed solidification.



Debris generated after the Moon-forming impact would have re-impacted the Moon and introduced additional heat transfer mechanisms from the conventional scenario.