

Institut für Geophysik

Geophysikalisches Kolloquium
Sommersemester 2020

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Planet formation in the lab: core-mantle differentiation after giant impacts

The Earth formed 4.5 billion years ago by large collisions between planetary embryos. These collisions set the initial temperature and composition for the later evolution of our planet. Based on numerical simulations, we know that, after each impact, the metallic core of the impactor separated from the mantle silicates and merged with the core of the proto-Earth. However, we do not know how mixed metal and silicates were during each collision. Their chemical equilibration, and the resulting composition of the core and the mantle, depend on this mixing.

I will present fluid dynamics experiments on large Earth-forming impacts. Our laboratory experiments replicate the cratering process observed in impact simulations and inferred at the surface of the Moon or Mars. We obtain scaling laws for mixing between the impactor and target as a function of the velocity and size of the impactor. From our findings, we infer the efficiency of equilibration between metal and silicates within the forming Earth. Our results also indicate that the stratification inferred from seismic data at the top of Earth's core could be a vestige of the giant impact that formed the Moon.

Das Kolloquium findet um 16 Uhr c. t. als Zoom-Videokonferenz statt. Der Link dazu wird auf der Homepage und per eMail rechtzeitig mitgeteilt.

Alle an dem Thema Interessierten sind hierzu herzlich eingeladen.

Die Dozenten des Instituts für Geophysik