

## ZARM Seminar

**Date:** January 16, 2025

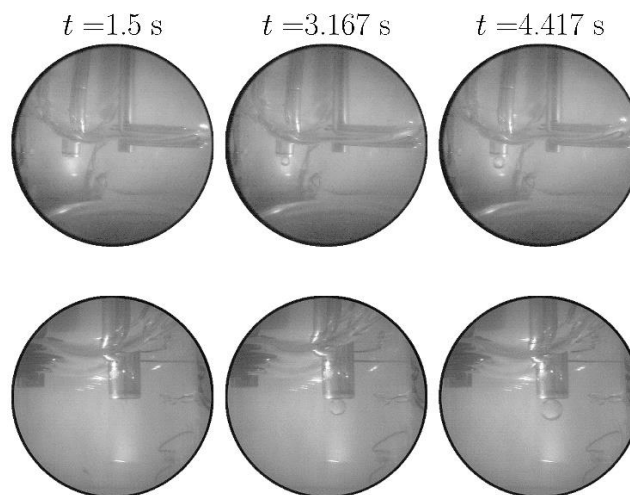
**Time:** 14:00 - 15:00

**Location:** ZARM, room 1730

### Hydrogen and Methane Vapor Bubble Growth in Microgravity

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A hydrogen vapor bubble growing at an artificial nucleation site caused by the application of a heat flow.

The use of cryogenics such as liquid hydrogen or liquid methane as propellants offers highly efficient rocket propulsion systems. But the handling of the cryogenic propellants in a space environment poses issues for the thermodynamic conditioning of the propellant. Liquids at temperatures close to their saturation temperature cannot be pumped to the engines without causing cavitation, which damages the pumps.

A subcooling can be introduced in the liquid by modulating the tank pressure. If the pressure is reduced, the liquid will become superheated. This superheat will cause phase change at any nucleation sites inside the tank.

In order to predict the system behavior, it is important to quantify the phase change at a single nucleation site. This was investigated experimentally and numerically at an artificial cavity.