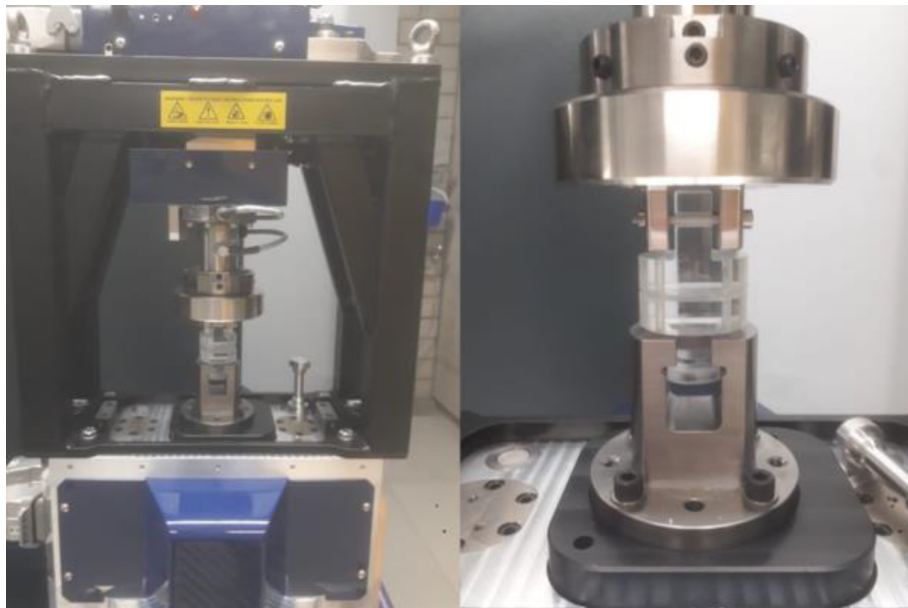


## Topic proposal

### Computed tomography and in-situ mechanical testing for the poker-chip experiment

X-ray tomography is a 3D imaging technique which enables the visualization of material samples including their inner structure with pores, voids, possibly heterogeneous constituents, as well as cracks, at different levels of resolution and scale. Through its combination with in-situ load testing, it is possible to visualize the changes to the inner structure including the nucleation and propagation of cracks under increasing load.

The so-called poker-chip experiments of Gent and Lindley, published in 1957 and 1959, triggered a series of fundamental investigations on the nucleation of internal cracks in elastomers subject to externally applied mechanical loads, a phenomenon now commonly referred to as cavitation. In this thesis, we aim at revisiting Gent and Lindley's experiments by carrying them out inside an X-ray microtomograph. We expect to shed new light on their results, as well as to be able to elaborate the new results exploiting digital volume correlation techniques. If time allows, a comparison with simulation results on the fracture behavior of elastomers can be conducted.



Figures: Test setup for the poker-chip experiment inside the X-ray microtomograph.

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