

# Software Lab: Digital Image Correlation for Fracture in Core Samples

## Setting

Fracture in geological rock is a complex process. To generate new insights into the fracture behavior, a combination of experiments and simulations of uni-axial compression tests on core samples is used. For validation of the numerical model the experiments were recorded using a high-speed camera (Fig. 1). This allows for a detailed analysis of the experiments using computational methods. Here, we are particularly interested in locating the fracture initiation as well as obtaining displacements on the surface of the rock using digital image correlation.

The goal of this project is to implement a software tool for an analysis of the generated movies with digital image correlation.



Fig. 1: Picture of the fracturing specimen taken with the high-speed camera.

## Tasks

Implement a software tool that:

- uses digital image correlation to calculate displacements and strains
- allows for a precise location of fracture initiation and propagation (see Fig. 2)

## Supervisor

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## References

[1] Pan, Bing, and Qiong Wang. "Single-camera microscopic stereo digital image correlation using a diffraction grating." *Optics express* 21.21 (2013): 25056-25068.

[2] Boulekbache, Bensaïd, et al. "Failure mechanism of fibre reinforced concrete under splitting test using digital image correlation." *Materials and Structures* 48.8 (2015): 2713-2726.

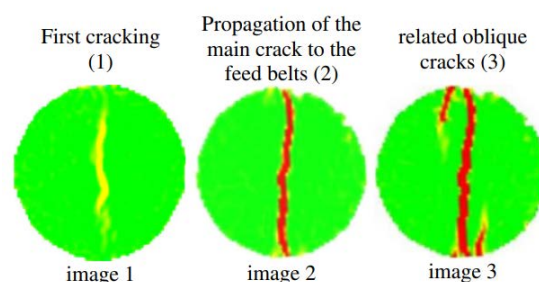


Fig. 2: Extraction of cracks using DIC [2]