

## **Discrete Element Method and its application to materials failure problem on the example of Brazilian Test**

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The earthquake focus is the point where a rock under external stress starts to fracture. Understanding earthquake nucleation and earthquake dynamics requires thus understanding of fracturing of brittle materials. This, however, is a continuing problem and enduring challenge to geoscience. In spite of significant progress we still do not fully understand the failure of rock materials due to extreme stress concentration in natural condition. One of the reason of this situation is that information about natural or induced seismic events is still not sufficient for precise description of physical processes in seismic foci. One of the possibility of improving this situation is using numerical simulations – a powerful tool of contemporary physics.

For this reason we used an advanced implementation of the Discrete Element Method (DEM). DEM's main task is to calculate physical properties of materials which are represented as an assembly of a great number of particles interacting with each other.

We analyze the possibility of using DEM for describing materials during so called Brazilian Test. Brazilian Test is a testing method to obtain the tensile strength of brittle material. One of the primary reasons for conducting such simulations is to measure macroscopic parameters of the rock sample. We would like to report our efforts of describing the fracturing process during the Brazilian Test from the microscopic point of view and give an insight into physical processes preceding materials failure.