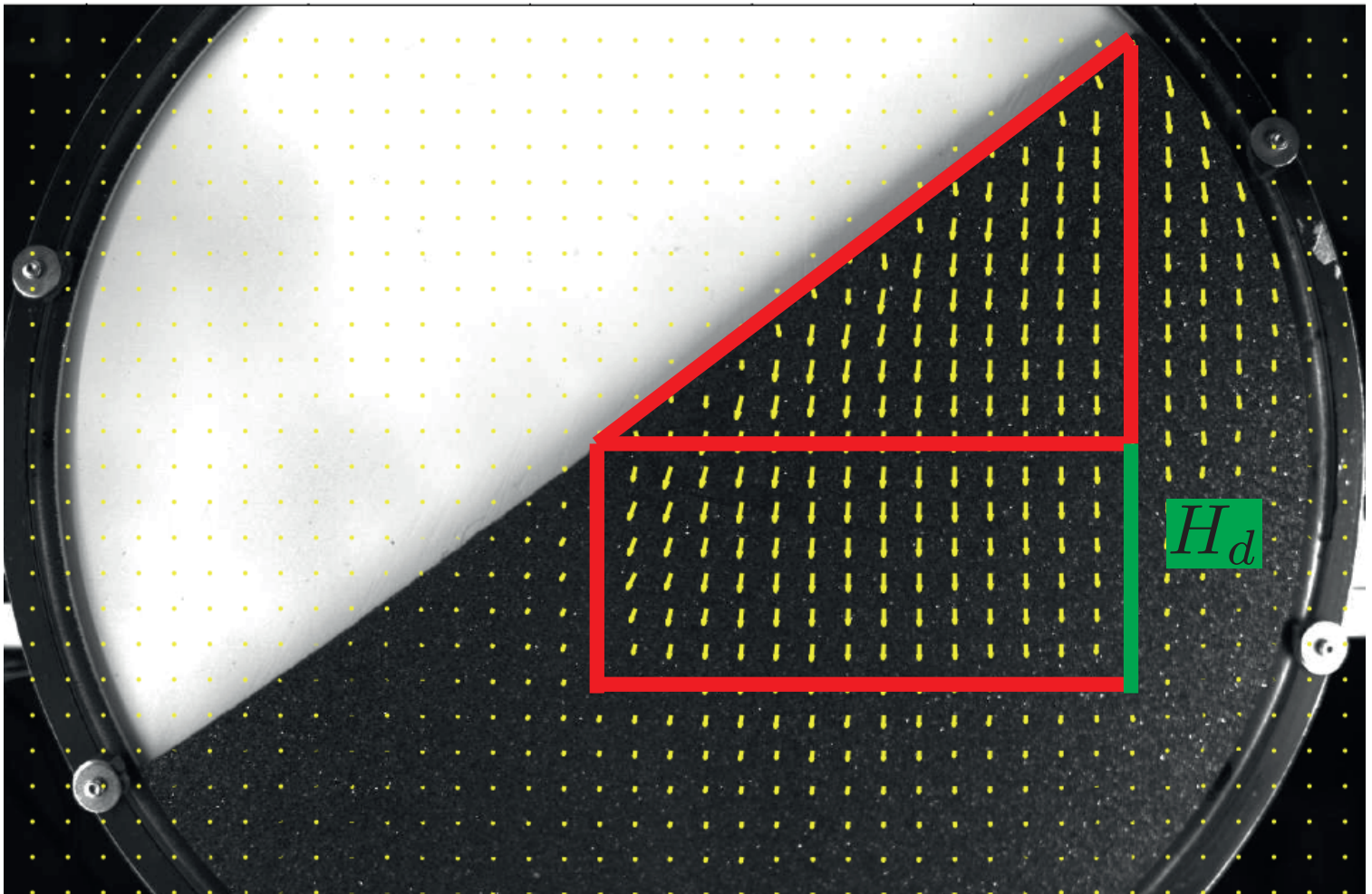


## Poly-directional Stability of Granular Matter

Fabian Zimmer

Lehrstuhl für Multiskalensimulation, FAU Erlangen Nürnberg



*Cumulative velocity field during a collapse obtained by PIV. The vector arrows are magnified for better visibility. The region of non-vanishing velocities indicate the volume affected by the collapse.*

By means of a rotating drum experiment, we introduce the state of poly-directional stability in jammed granular matter where the material responds elastically to small stresses in a wide angular interval. Only to small stresses which are directed in a relatively small interval of directions the material responds by plastic deformations. The state of poly-directional stability complements the fragile state, where the material responds elastically to small applied stresses only in a certain direction but even very small stress in any other direction would lead to plastic deformations. Similar to fragile matter, poly-directionally stable matter is created in a dynamic process by self-organization.

