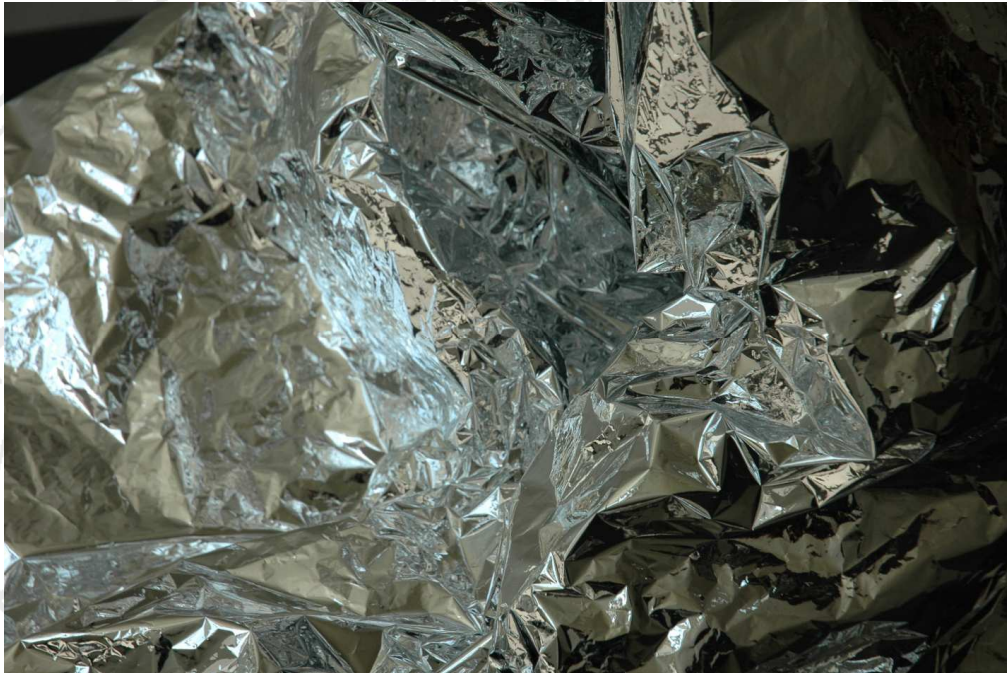


PHYSIKALISCHES KOLLOQUIUM

AM 11. JULI 2011 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



THE ANATOMY OF CRUMPLING: EMERGENT STRUCTURES FROM THE COLLAPSE OF THIN SHEETS

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Squeeze a thin wire between your hands; it curls up smoothly to fit the allowed space. Now squeeze a thin sheet in the same way; the deformation is very different. The sheet **crumples** into sharp point-like and line-like structures. These sharp structures were not explicitly shaped by the squeezing force: they emerge spontaneously.

This talk explores such emergent structures created by the conflict between the external confining force and the elasticity of the sheet. By analyzing the limiting regime of very thin sheets, we show that the characteristic size of the sharp structures defines an emergent length scale, indefinitely smaller than the size of the sheet. The structures thus **focus** energy and stress to an arbitrary degree. This characteristic focusing follows a quantitative law common to all sufficiently thin elastic sheets. These basic structures give rise to subsidiary structures with their own emergent length scales. We discuss the generality of this elastic focusing mechanism and compare it to conventional forms of focusing.