

# Colloquium

**SFB 956**

Conditions and Impact of Star Formation

**27 January 2020**

Monday 3:00 pm

**Physikalische Institute Köln**

Lecture Hall III

Zülpicher Straße 77 | 50937 Köln

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## **Towards a Unified Model for Star-formation**

Using single-dish and ALMA molecular observations, we have investigated the internal structure of several paradigmatic nearby proto-clusters across their entire mass spectrum. In all cases, the analysis of different molecular line tracers indicates a high level of internal organization in which apparently monolithic clumps are actually complex networks of small-scale fibers. In both low- and high-mass clusters, fibers are characterized by presenting transonic internal motions respect to their local sound speed and a mass per-unit-length close to hydrostatic equilibrium. Conversely, the fiber dimensions (width and length) appear to be self-regulated depending on their intrinsic gas density of their local environment. Combining observations in different star-forming regions, we identify a systematic increase of the surface density of fibers as a function of the mass of these systems. Based on this empirical correlation, we propose a unified star-formation scenario where the observed differences between low- and high-mass clouds, and the origin of clusters, emerge naturally from the initial concentration of fibers.