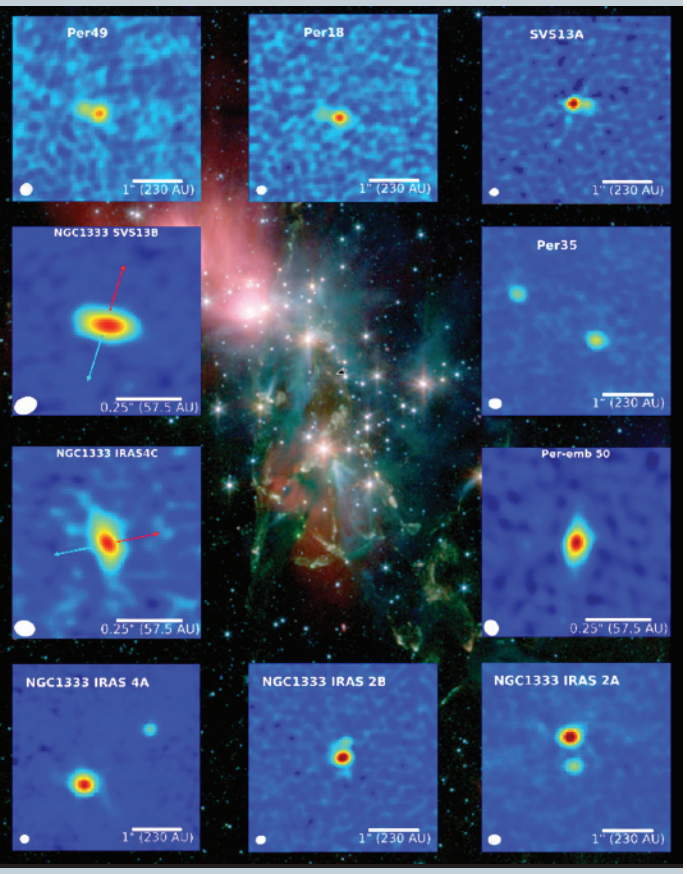
Colloquium

SFB 956

Conditions and Impact of Star Formation

30.05.2016
Monday 3:00 pm

Physikalische Institute Köln
Lecture Hall III
Zülpicher Straße 77 | 50937 Köln



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Revolutionizing Our View of Solar System Birth and Multiple Star Formation

Proto-planetary disks are the birthplaces of planetary systems and they are thought to form at the onset of star formation due to conservation of angular momentum. These very young disks may also be massive enough to be gravitationally unstable due to the rapid infall of mass from the collapsing cloud, enabling companion stars and possibly giant planets to form within disks. However, theory and simulations have suggested that the formation of large, massive disks may be difficult due to the removal of angular momentum by magnetic fields. Observations are now sensitive enough to test these predictions, and we identified the first Keplerian disk around the youngest class of protostar. Moreover, ALMA observations are uncovering new Keplerian disks, in addition to enabling their molecular content to be examined. At the same time, we are using data from a large VLA survey to transform our knowledge of protostellar disks and multiple star systems at spatial resolutions of ~15 AU. We have identified new protostellar disk candidates that exhibit evidence or dust growth to ~cm-sizes and radial drift of solids already having occurred in the protostellar phase. Thus, magnetic fields may not strongly suppress the formation of disks > 10 AU in many cases. We have also discovered closer multiple systems than ever before, finding strong evidence for a bimodal distribution of protostar companion separations. This is suggestive of distinct mechanisms for multiple star formation acting on different scales. Finally, we also see indications of evolution in the separation distribution for younger protostars relative to those that are more-evolved. These results open the door to expanded multiplicity and disk surveys to determine if the initial trends we find are robust.