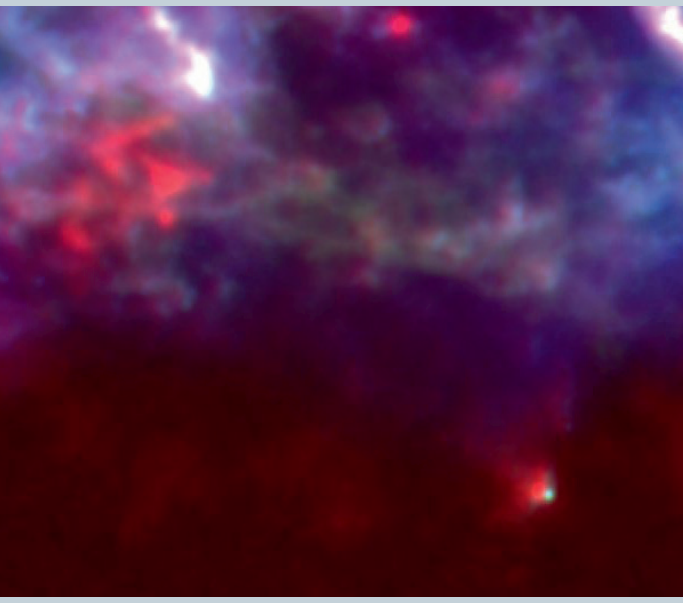
Colloquium

SFB 956

Conditions and Impact of Star Formation

13.07.2015
Monday 4:00 pm

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



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Deep Surveys with GISMO: Searching for Luminous Starforming Galaxies at the Highest Redshifts

The GISMO 2 mm bolometer camera the IRAM 30m telescope has been available to the astronomical community for many years. GISMO provides observational capabilities across a wide range of astronomical targets, including observations of galactic dust and free-free emission, the characterization of the SEDs of nearby galaxies, detecting dusty galaxies at high redshifts, and measurements of the Sunyaev–Zel'dovich decrement in the Cosmic Microwave Background Radiation, which traces the evolution of massive galaxy clusters throughout the history of the universe. The 2mm band is in particular well suited to trace the first dusty galaxies in the universe, since their redshifted SEDs peak close to GISMO's observing frequency, whereas the medium redshift galaxy foreground is almost invisible in this band. This effect makes GISMO's deep field observations a valuable complement, rather than a redundancy, to the HERSCHEL far-infrared and sub-mm surveys. Two deep sky surveys with GISMO.

Following a brief overview over some science highlights from the large variety of GISMO projects, we will describe two survey projects in detail. Models predict that an appreciable number of galaxies serependiously detected in deep 2mm surveys will be at very high redshifts (z~5-6 and above) with intrinsic luminosities of a few 10^{12} L_{sol}. The galaxy number counts, which can be derived from those surveys, provide new information on the evolution of star-forming galaxies throughout the history of the universe, one of the core science goals of GISMO. The first of these surveys is the GISMO Deep Field (GDF), which is centered on the Hubble Deep Field North. This deep survey by now has reached the confusion limit of the 30m telescope (we measure a confusion noise of 60 microJy at 2mm wavelength), and therefore provides galaxy count numbers at the lower end of the luminosity function. The second survey covers a shallower ~ 1/4 square degree region in the COSMOS field, in which by now we have obtained sufficient sensitivity to extract statistically relevant galaxy number counts at higher luminosities than in the GDF. By using auxiliary data, we also can study the redshift distribution of our deep field sources. We will present first COSMOS results that complement those obtained in the deeper GDF. A statistical analysis of the survey data provides a solid estimate of the expected rate of false detections among the source identifications. Furthermore, numerical simulations were used to estimate the „completeness" of our set of extracted sources. We will discuss how the derived galaxy counts compare to model predictions, allowing us to test galaxy evolution models.

Finally, we will provide an outlook into the future by outlining the variety of science questions, which we anticipate to address with our new dual band (1mm and 2mm) bolometer camera GISMO-2.