

# Surveys for ALMA

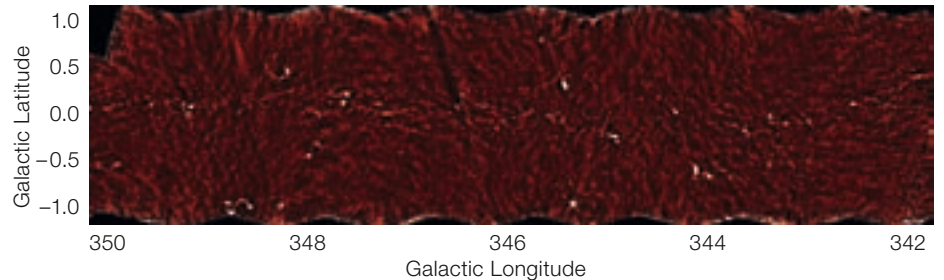
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Leonardo Testi  
Carlos De Breuck  
(ESO)

Current plans for surveys with existing, or soon to be operational, space and ground-based facilities relevant for ALMA science were presented and discussed. Special attention was given to the survey plans with the Atacama Pathfinder Experiment (APEX) and early results from pilot surveys were presented. The goal of the meeting was to ensure that optimal use can be made of ALMA as soon as operations begin. The role of surveys and large programmes in the early years of ALMA was also discussed.

The 'Surveys for ALMA' workshop was held immediately following the ALMA Community Days. The workshop was partly supported by Radionet. The goals were to review the current plans for surveys relevant to ALMA, either ongoing or about to begin in the coming years, and evaluate whether these were adequate to ensure optimal use of ALMA from the beginning of science operations. The possible role of surveys and large programmes with ALMA during Early Science and the first years of Full Science Operations, and the synergy with other major facilities, were also discussed.

Many contributions reviewed the current plans for surveys from radio through infrared to optical wavelengths. The main facilities discussed were the Spitzer and Herschel Space Observatories, as well as the ESO survey telescopes (APEX at millimetre wavelengths and VST/VISTA in the optical and near-infrared), and other international observatories such as the JCMT, IRAM, NANTEN and ASTE, and the NRAO and ATNF facilities. The discussion that followed these presentations highlighted that there is a comprehensive plan in place for surveys that will provide ample ground for ALMA follow-up during Early Science and the first years of operations. In this phase, considering that ALMA will rapidly expand its capabilities up to Full Science Operations and that commissioning activities will proceed in parallel with science operations, there



**Figure 1:**  $8 \times 2$  degrees of the Galactic Plane at  $870 \mu\text{m}$  as seen in the APEX/LABOCA ATLASGAL survey (PI: F. Schuller/C.M. Walmsley). Approximately 60% of the sources discovered by ATLASGAL were not previously detected by IRAS or MSX. Surveys at mm wavelengths like this one will provide whole new classes of sources for ALMA follow-up in the coming years.

will probably be little scope for very large programmes with ALMA during these early years.

The general sentiment among the workshop participants was that as soon as the full ALMA capabilities will be available, a number of large projects will become possible and it will be necessary to think of possible schemes to handle this type of programme.

The possible synergies between ALMA and other large future facilities, like JWST, EVLA, CCAT and SKA, were briefly discussed. In the future it may be useful to explore possible ways to optimise programmes that will require the use of ALMA in conjunction with these facilities, in a similar fashion to what is currently done with ESO-VLT and ESA-XMM.

On the afternoon of 6th September, a topical meeting on the coordination of Surveys with APEX was also held in Garching, and was attended by about 50 participants. The three APEX partners (MPIfR, ESO and Sweden) first explained their respective time allocation procedures and provisions for large programmes. As each partner has a limited amount of observing time on this heavily oversubscribed facility, there is a clear desire to

collaborate on large projects to increase their scientific impact.

Next, the results from pilot studies for two surveys were highlighted, both using the LABOCA bolometer array: (1) a joint ESO + MPIfR project to map the Extended Chandra Deep Field South. A first map including 100 hours of observing time has already identified more than a dozen new submm sources; (2) the ATLASGAL survey of the Galactic Plane is a joint project between the MPIfR, ESO and Chile exploiting the wide-field capabilities of LABOCA (see Figure 1).

Finally, plans for other surveys were also introduced, including further cosmological surveys with both LABOCA and the APEX SZ camera. Surveys include mapping of galaxy lensing clusters, the SMC and LMC, southern star-forming regions in Chamaeleon and Lupus III, main-sequence stars in nearby moving groups and CO surveys in nearby galaxies. Clearly, there will be no shortage of ideas on how to use APEX in the coming years!

The programme and presentations from the 'Surveys for ALMA' workshop can be found online at <http://www.eso.org/projects/alma/science/meetings/gar-sep07/agendas.html>.