

Preface

Many of the ISO observers who assembled for this workshop at Ringberg castle met for the third time in the Bavarian Alps. At two previous meetings in 1989 and 1990 surveys were only a minor topic. At that time we were excited by the discoveries of the IRAS survey mission and wanted to follow it up with pointed observations using an observatory telescope equipped with versatile instruments. With the rapid development of detector arrays and stimulated by ISO's Observing Time Allocation Committee, however, surveys eventually became an issue for the upcoming mission. In a review paper on "Infrared Surveys - the Golden Age of Exploration" given at an IAU meeting in 1996, Chas Beichman already mentioned that there are ISO surveys. They were at the bottom of his hit list, while the winners were future space missions (Planck, SIRTf, etc.) and ground-based surveys in preparation (Sloan, 2MASS, DENIS, etc.). He organized his table according to the relative explorable volume, calculated from the solid angle covered on the sky and the maximum distance derived from the detection sensitivity. Clearly, with this figure of merit, ISO, as a pointed observatory, is rated low.

Applying the classical definition of a survey, i.e. to search in as large a volume as possible for new or rare objects and/or study large numbers of objects of various classes in order to obtain statistical properties, ISO was indeed limited. As is usual in an observatory mission, hundreds of observers competed with hundreds of proposals, therefore only limited samples of certain objects could be allocated to individuals.

However, if we extend the definition of a survey to include the investigation of reasonable samples of similar objects, then ISO was indeed a great survey mission. For the first time on a cooled space mission, the observatory offered several unique capabilities:

- Mid-infrared deep imaging with unprecedented sensitivity.
- 200 μm mapping with a spatial resolution comparable to that of IRAS at 100 μm .
- Similar sensitivity to COBE but much higher spatial resolution for exploration of the far-infrared extragalactic background.
- High and low spectral resolution capabilities over the wide wavelength range of 2 – 200 μm .
- Far-infrared polarization studies.

- Complementary surveys performed with “no cost” of observing time in parallel to the main instrument or during slews or to fill small gaps in the scheduled observations.

The ISOCAM surveys at 15 μm and the ISOPHOT surveys at 170 μm have revealed many new sources in the distant universe. This has impressively demonstrated that even with a 60-cm telescope, if cooled, important cosmological questions, such as star formation history in the young universe, can be addressed. The infrared is a key region for this research because many of these young galaxies are dust-enshrouded. In addition, ISO has delivered many template spectra for luminous galaxies such as ULIRGs, starbursters, and AGNs throughout the whole infrared wavelength region. ISO data already place serious constraints on the galaxy evolution models and are stimulating many follow-up observations to explore fully the nature of the sources discovered.

The 170 μm Serendipity Survey presented its first galaxy catalogue at this workshop. It is the largest one so far beyond the IRAS limit and already provides significant statistical answers to questions on the dust content of galaxies. Moreover, it has identified interesting “cold” galaxies to follow up. The success of the four parallel, serendipity and filler surveys should encourage ESA to proudly publicize this fact, as expressed by Michael Rowan-Robinson, the chairman of the relevant session.

The very positive response to the call for this Ringberg workshop has been an indication that the topic “ISO Surveys of a Dusty Universe” was exactly right at this time, 1 1/2 years after boil off of the helium. Large survey databases, with entries often close to the noise limits and requiring the elimination of unwanted components in the signals, need more analysis time than individual observations. Mike Hauser, who presented his important extragalactic background results from COBE/DIRBE after many years of careful analysis, has reminded us that quality is more important than speed.

With the now unlimited access to ESA’s data archive of the whole ISO mission, several survey projects can increase their number of objects. Others, such as the CAM parallel survey, have just lifted the veil of a huge database still to be explored. Within the next few years, ISO surveys will certainly become a treasure trove for targets of the upcoming infrared missions SIRTf, SOFIA, and FIRST.

Because of the multi-wavelength character of various related topics such as AGN contributions to the IR sky, we enjoyed several exciting non-ISO reviews presented by Günther Hasinger, Chas Beichman, and David Schlegel. We acknowledge the support of our colleagues in the scientific organizing committee (C. Beichman, C. Cesarsky, T. Henning, M.F. Kessler, K. Mattila, M. Rowan-Robinson) who set up an excellent scientific programme. The local organizing committee (supported by U. Klaas and L. Schmidtobreick) prepared and ran the workshop smoothly. We thank them and the staff of the MPG meeting place “Schloss Ringberg” for the comfortable stay in the

inspiring atmosphere experienced that week. We are indebted to the Max-Planck Society and to Deutsches Zentrum für Luft- und Raumfahrt (DLR) for supporting this meeting.

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