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November 18, 1993

Final

193076

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Final Technical Report - for NAG 5 1710

8/1/92 - 7/31/93

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A typical pointed observation in IRAS was designed to fit into a 15 minute window. Observing constraints, however, did not always permit targets from the scientific program to be observed on exactly 15 minute centers and a few months into the mission it was realized that the automatic scheduling program left times when no observations were being made. In order to use this potentially wasted observing time, a mode of pointed observations, the "filler" mode, with shorter observation duration was initiated. Locations were picked on an arbitrary grid, spaced relatively uniformly in ecliptic coordinates, and the telescope was pointed to one of these sites whenever a gap potentially occurred. One of us (GXN) was the coordinator of this effort (the FL sub-group). There are a total of 22 FL fields, 13 of which have more than 50 component observations. These 13 fields cover about 30 square degrees.

Under this grant, we proposed to concentrate on one filler field, FL29, a field with 53 coverages which thus had among the deepest coverage of those observed in this mode. This field has also been observed extensively at various non-infrared wavelengths by a variety of techniques. Because the IRAS observations of FL29 were made at the limits of the survey sensitivity and at different twist angles it was necessary to make significant technical advances in the methods used in the processing and analyzing the data. In particular, if normal IRAS coaddition procedures were used, the noise resulting from coaddition of the multiple frames did not decrease in the manner expected once significantly different twist angles were included in the coaddition.

We have completed the technical effort needed to reduce the observations of FL29 and now the noise behavior is understood and well behaved. The reduction of the field FL29 observations is done.

Part of our ADP proposal was to use FL29 to add to the statistics in exploring the evolution of galaxies by examining the number density of the faintest galaxies in the FL29 field. Based on our success

in coadding the components of the FL29 field, we have realized that, in fact, we could increase the number of faint galaxies available for studying the evolution of galaxies by almost a factor of ten if we used all the well observed filler mode pointed observations.

The results of our work from all the deepest filler mode observations are included in Figure 1. Our data base is as anticipated. Even when severe cuts were made on the data base - the most important is the requirement that we only use fields with eight or more coverages - we have 746 galaxies with signal to noise ratios greater than 5.0.

As a result of the success of the work done under this ADP grant, we have received a new grant to reduce and understand all the filler field observations. The result obtained under this ADP proposal are written up, but will be included in a fuller work describing all the observations.

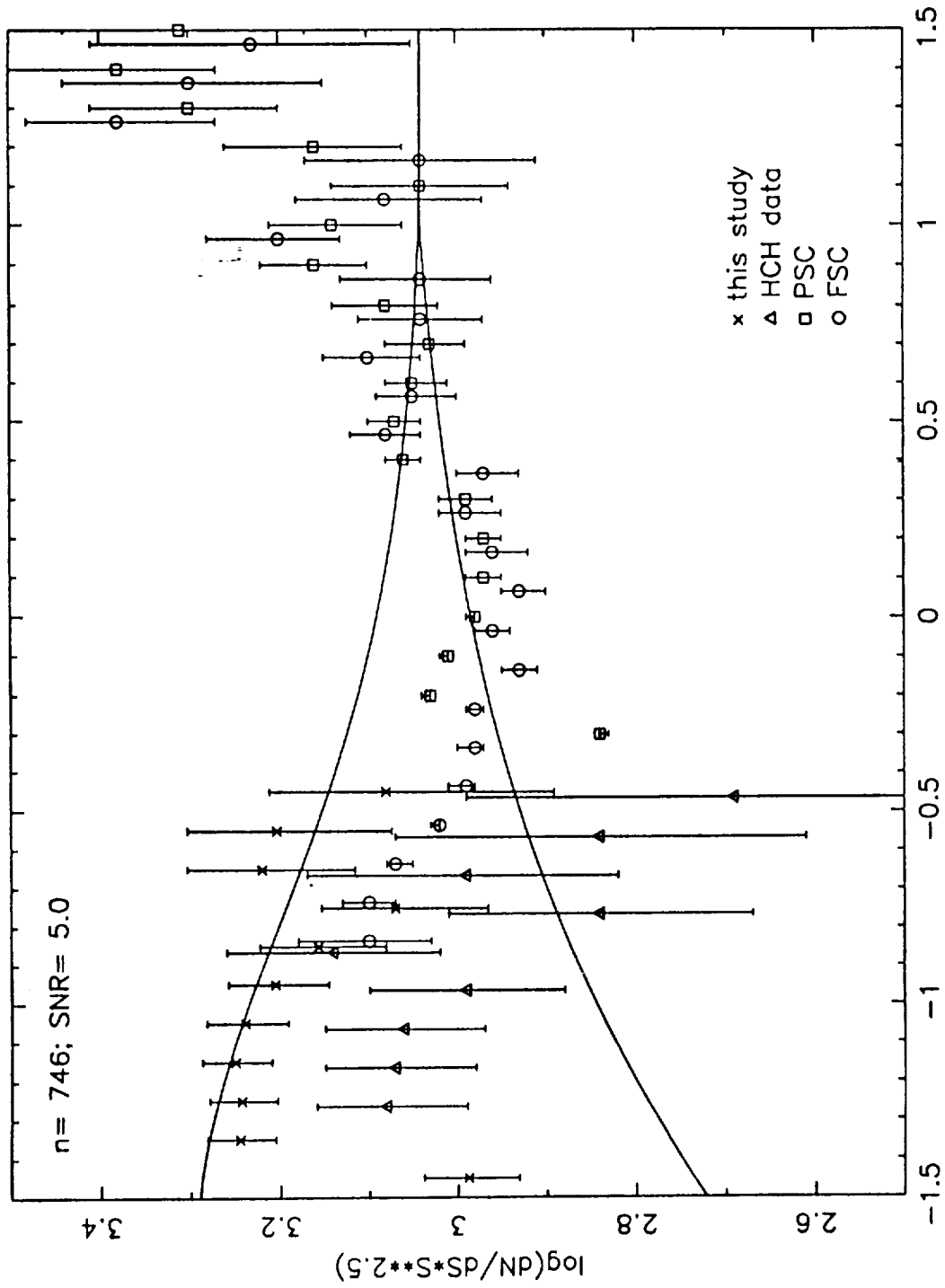

Figure 1. Predicted and observed differential source counts at 60 μm. The predicted source counts are shown as solid curves. The upper curve is from Condon's standard model while the lower curve is the no evolution model. The observed source counts are from studies described in the text.