Infrared Astronomy and Star Formation from Antarctica

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The Antarctic Plateau provides the pre-eminent conditions on the Earth for wide-field imaging at thermal infrared wavelengths. From 2.2 to 20 microns there are reductions in the sky background of between 20 and 100 times (depending on wavelength) from temperate latitude sites. The site seeing is also of a quite different nature, being confined almost entirely to the lowest 100m of the atmosphere, resulting in larger isoplanatic angles and coherence times for the seeing cells. Such conditions open up the possibility of deep observations in the thermal IR that simply cannot be conducted from any other ground based site. Of particular interest will be wide-field surveys of star formation regions, such as the following:

Line imaging of embedded HII regions along the galactic plane in the Br-alpha (4.05um), PAHs (3.28um) and H2 Q-branch lines (2.42um), to study the environment of the ionized, neutral and molecular mediums of massive star forming regions.

Complete population censuses of the embedded populations of star forming clouds in the L (3.8um) band, both in our Galaxy and in the Magallenic Clouds, utilising the improved sensitivity to disk emission for identification.

Imaging of the most deeply embedded protostars in the mid-IR, from 10-30um.

The star formation history of the Universe through complementary deep L and M (4.5um) band imaging to the HDF-S. These would be sensitive to particularly red galaxies at high redshift; for instance an E/S0 galaxy at z=1.4 has an (unreddened) V-L=10.

We compare the sensitivity of such surveys from Antarctica with those from mid-latitude sites, and propose a 2.5m telescope, SPIRIT, which would be able to achieve unique new science at relatively low cost, complementing the research programs of the new generation of 8m class telescopes.

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Special instructions: To go in "ISM and Star Formation" working group section of Antarctic session.

Workshops in the Future of Antarctic Astrophysics [X]

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