

AIRES: AN AIRBORNE INFRA-RED ECHELLE SPECTROMETER FOR SOFIA. J. Dotson¹, E. Erickson², M. Haas², S. Colgan², J. Simpson¹, C. Telesco³, J. Wolf⁴, and E. Young⁵, ¹SETI Institute (NASA Ames Research Center, MS 245-6, Moffett Field, CA, 94035; dotson@cygnus.arc.nasa.gov), ²NASA Ames Research Center, ³University of Florida, ⁴DLR, ⁵University of Arizona.

SOFIA will enable astronomical observations with unprecedented angular resolution at infrared wavelengths obscured from the ground. To help open this new chapter in the exploration of the infrared universe, we are building AIRES, an Airborne Infra-Red Echelle Spectrometer. AIRES will be operated as a first generation, general purpose facility instrument by USRA, NASA's prime contractor for SOFIA. AIRES is a long slit spectrograph operating from 17 – 210 μ m. In high resolution mode the spectral resolving power is $\sim 10^5 \mu\text{m}/$ or $\sim 10^4$ at 100 μ m. In low resolution mode the resolving power is about 100 times lower. AIRES includes a slit viewing camera which operates in broad bands at 18 and 25 μ m.

AIRES will be ideal for spectral imaging of gas-phase phenomena in the interstellar medium (ISM). Far-infrared line observations probe the excitation, pressure, density, luminosity, chemical composition,

heating and cooling rates, mass distribution, and kinematics in the various components of the ISM. The lines offer invaluable and often unique diagnostics of conditions in such diverse places as star forming regions, circumstellar shells, the Galactic Center, starbursts in galaxies, and the nuclei of active galaxies. AIRES will provide astronomers with new insights into these and other environments in the ISM. It will also be useful for studies of solar system phenomena such as planetary atmospheres and comets, for example.

AIRES' low resolution mode will enable comparison of infrared continuum emission with line emission from interstellar clouds. It will also permit measurement of long wavelength features of interstellar grains and solid surfaces of solar system bodies, as well as a variety of other problems.