What is EXES?
• Mid-IR High-Resolution spectrograph for SOFIA
• 1024 x 1024 Si:As detector
• 4.5 - 28.3 μm range
• 0.5-4% spectral coverage per setting, depending on choice of cross-disperser and spatial slit length
• Three spectral modes: high (R=100,000) medium (R=15000) and low (R=3000)
• Observing modes: nodding & mapping

Search for Europa’s ice plumes at 6.1 μm
• EXES has set useful upper limits for 3 strong ro-vibrational transitions of water near 6.1 μm including the H2O ν1, 11, 0-0 line in March and May 2017, covering the leading and trailing side hemispheres of Europa.
*The limits for both dates and hemispheres depend on the assumed gas temperature – for reasonable values seen in cometary gas of 10-100K, the upper limits for numbers of H2O molecule are ~5x1012 (10K) ~5x1013 (100K); the implied number of molecules from the HST/STIS transit observations is 1.2 x 1012.

SO2 gas towards the massive YSO Mon R2 IRS 3
• In dense clouds and protostellar environments only a few percent of cosmic sulfur has been identified.
• EXES has resolved SO2 bands previously seen by ISO, finding narrow line widths (<3.2km/s) and T=234 K, locating the gas in a quiescent region close to the protostellar core, where presumably, sulfur-bearing ices have been evaporated, and SO2 has formed by warm gas-phase chemistry. SO2 gas accounts for 6% of the sulfur budget.
• Similar work is underway for other hot cores with gas-phase SO2 detections from ISO.

Future Flights and Observing Availability
• Cycle 7 (May 2019- Apr 2020) programs just announced. Cycle 8 (May 2020–) call for proposals in fall 2019. Directors Discretionary Time proposals (e.g. Jovian storms, comets) are accepted at any time.
• EXES exposure time calculator → http://irastro.physics.ucdavis.edu/exes/etc/
• Proposers are encouraged to contact EXES team for advice and assistance.
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