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Montiel, E.; Dittmann, J.; Nickerson, S.; Boogert, A.; Cernicharo, J.; de Pater, I.; ... ; Vacca, W.

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Seeing the Trees through the Forest: Early Results from the SOFIA/EXES Mid-IR High Spectral Resolution Library

Edward Montiel[1] Jason Dittmann[2] Sarah Nickerson[3]
Abraham Boogert[4] Jose Cernicharo[5] Imke de Pater[6] Drake Deming[7]
Curtis DeWitt[1] José Pablo Fonfría[8] Guido Fuchs[9] Steven Goldman[1]
Karl Gordon[10] Graham Harper[11] Kathleen Kraemer[12]
Laura Kreidberg[13] Patrick Morris[14] Conor Nixon[15] Glenn Orton[16]
Naseem Rangwala[3] Maisie Rashman[1] Matthew Richter[17]
Ravi Sankrit[10] Gregory Sloan[10] Archana Soam[18] Clara Sousa-Silva[19]
Alexander Tielens[20] William Vacca[1]

[1]SOFIA-USRA, [2]University of Florida, Gainesville, [3]NASA Ames Research Center,
[4]University of Hawaii, [5]CSIC IEM, [6]University of California, Berkeley,
[7]University of Maryland, College Park, [8]Astrobiology Center (CAB), CSIC-INTA,
[9]University of Kassel, [10]Space Telescope Science Institute, [11]University of Colorado, Boulder,
[12]Boston College, [13]Max Planck Institute for Astronomy, [14]Caltech, [15]NASA GSFC,
[16]Jet Propulsion Laboratory, [17]University of California- Davis,
[18]Indian Institute of Astrophysics, II Block, [19]Bard College, [20]Leiden Observatory

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We proposed the creation of a high spectral resolution (R ≥ 50,000) library of classical, MIR-bright sources covering ~5.23 to 28.3 micron with SOFIA/EXES. This proposal was awarded 100+ hours with 18.1 hours scheduled for 3 sources in May 2022. The observations were successfully carried out and the sources included: the archetypal Carbon star IRC +10216, and the hot cores NGC 7538 IRS 1 & AFGL 2136. The full suite of settings was observed for IRC +10216 with R ~ 70,000 and S/N (on the continuum) ≥ 1,000. The coverage for the hot cores begins at 13.5 micron and for NGC 7538 IRS 1 continues all the way to 28.3 micron. Archival EXES observations are used to supplement the 5 to 8 micron region and all observations are at R = 50,000. Thousands of molecular transitions are contained within these spectra and we present some of our early findings. The data are publicly available in the SOFIA Science Archive at IRSA under Program ID 75_0106.