8:30 Introductory Remarks.
9:55 INTERMISSION
10:25 (559). From weeds to dust: Astrochemical insights by rotational spectroscopy. A. Steber
11:05 (560). Tracing the origins of nitrogen bearing organics toward Orion KL with ALMA. B. Carroll, G.A. Blake
11:25 (561). From one to two dimensional interstellar carbon: A synthesis of laboratory, observations, and theory. B. McGuire, K. Lee, M.C. McCarthy

THURSDAY AFTERNOON (ROOM 160B)
Condensed-Phase Astrochemistry
K. Oberg, Presiding
1:30 Introductory Remarks.
1:35 (588). Study of morphology, diffusion and ordering kinetics of CO$_2$ and CO$_2$H$_2$O thin film ices. G. Vidali, J. He, S. Emtiaz
2:15 (589). Some subtle problems of ice-phase astrochemistry and spectroscopy. R.L. Hudson, P. Gerakines
2:35 (590). Laboratory spectroscopy with a miniature mm-wave cavity spectrometer and coupled laser-ablation source. A. Raymond, B. Drouin, M. McCarthy, K. Lee, E. Mazur
2:55 INTERMISSION
4:25 Concluding Remarks.
## SUNDAY AFTERNOON

**Astrochemical Challenges & Opportunities**  
K. N. Crabtree, Presiding

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| 1:35 (81) | Cavity-enhanced millimeter and submillimeter spectroscopy as a probe of reaction dynamics.  
S.L. Widicus Weaver, K. Roenitz, C. Wright, H. Bunn, C. Powers, K. Yocum |                                                                                                 |
| 2:15   | "Grotthuss-like" proton relays in anomalous carbocarbons dictate spectroscopy, stability and mechanisms: Case studies on small and medium sized non-classical hydrocarbons along with deuterated counterparts.  
S.S. Iyengar |                                                                                                 |
| 2:35 (83) | Photoelectron-photon coincidence spectroscopy for laboratory astrochemistry: UUV Photodynamics of radicals, PAHs, sulfur containing compounds and other peculiar molecules.  
H.R. Hrodmarsson, G. Garcia, L. Nahon |                                                                                                 |
| 2:55 INTERMISSION |                                                                 |                                                                                                 |
| 3:25 (84) | Computing rotational, rovibrational, and vibrational spectra for astronomical observations: high accuracy line lists for high temperatures, limited line lists for biosignature molecules, and PAH emission spectra.  
T.J. Lee |                                                                                                 |
| 4:05   | Utilizing tunable vacuum ultraviolet light for isomer specific detection of complex organic molecules from astrophysical ice analogues: The hydrocarbon chemistry of interstellar ices.  
M. Abplanalp, S. Gobi, R. Kaiser |                                                                                                 |
| 4:25 (86) | Developments in high-resolution spectroscopy of Rydberg states of small molecules.  
T. Barnum, J. Jiang, R. Field |                                                                                                 |

## MONDAY MORNING: New Experimental Methods

M. C. McCarthy, Presiding

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| 8:35 (132) | Terrestrial progress toward infrared spectroscopy/detection of hydrocarbon radicals and molecular ions in the interstellar medium.  
D.J. Nesbitt |                                                                                                 |
| 9:15   | Preparation, characterization and storage of water vapours highly enriched in its ortho-H₂O nuclear spin isomer.  
| 9:35 (134) | Sub-Thz cavity enhanced absorption with a conventional confocal Fabry-Perot resonator.  
K. Trutt, R. O'Neal, J. Bracewell, L. Duffy |                                                                                                 |
| 9:55 INTERMISSION |                                                                 |                                                                                                 |
| 10:25 | Buffer-gas cell and molecular beam sources for chirality-sensitive spectroscopy and population transfer experiments.  
C. Perez, A. Steber, D. Patterson |                                                                                                 |
| 11:05 (136) | AC Stark effect observed in a microwave-(sub)millimeter wave double resonance experiment.  
| 11:25 (137) | Determination of the sign of the population difference in a two-level system by frequency-modulation spectroscopy.  
J. Jiang, Z. Du, R. Field |                                                                                                 |

## MONDAY AFTERNOON

**Optical & Infrared Astrochemistry: Large Molecules**  
S. Widicus-Weaver, Presiding

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| 1:35 (191) | Triple-resonance laser spectroscopy of protonated PAHs.  
T.W. Schmidt, S. Kable, K. Nauta, O. Krechikivska |                                                                                                 |
| 2:15 | Rotationally-resolved infrared frequency comb spectroscopy of the C₆H₆ fullerene.  
| 2:55 INTERMISSION |                                                                 |                                                                                                 |
| 3:25 | Interstellar PAHs: From ground to space, expanding spectroscopic frontiers.  
F. Salama |                                                                                                 |
| 4:05 (194) | Infrared spectra of protonated and hydrogenated corannulene (C₁₀H₁₀) and sumanene (C₁₀H₁₂) in solid para-hydrogen.  
P. Sundararajan, M. Tsuge, Y. Lee |                                                                                                 |
| 4:25 (195) | Validating the recent identification of interstellar C₆⁺ using VLT UVES and a new method for high-signal-to-noise HST STIS spectroscopy.  

## TUESDAY MORNING

**Optical & Infrared Astrochemistry: Small Molecules**  
K. L. K. Lee, Presiding

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| 8:35 (247) | Broad bandwidth laser frequency combs for terrestrial and astronomical spectroscopy.  
S. Diddams |                                                                                                 |
| 9:15 (248) | Purified para and ortho-water for fundamental physics and chemical reactions.  
J. Kupper |                                                                                                 |
| 9:35 (249) | Probing vibrationally excited states of astrophysically important species by stimulated emission pumping (SEP) spectroscopy.  
N. Reilly |                                                                                                 |
| 9:55 INTERMISSION |                                                                 |                                                                                                 |
| 10:25 | Spectroscopy of an argon-oxygen covalent bond in the ArOH⁺ cation.  
J.P. Wagner, D. McDonald II, M.A. Duncan |                                                                                                 |
| 10:45 (251) | Accuracy of spectroscopic constants predicted by explicitly correlated methods.  
M. Gronowski |                                                                                                 |
| 11:05 | Infrared spectrum of H₃⁺ as the probe for cosmic rays.  
T. Oka |                                                                                                 |

## WEDNESDAY MORNING

**Solar System & Planetary Atmospheres**  
S. Brünken, Presiding

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| 8:35 (309) | Spectroscopy and data science in the service of planetary remote sensing: the HITRAN and HITEMP databases.  
I. Gordon, L.S. Rothman, R.V. Kochanov, Y. Tan, C. Hill |                                                                                                 |
| 9:15 (310) | The ExoMol atlas of cool star and exoplanet molecular opacities.  
J. Tennyson, S. Yurchenko |                                                                                                 |
| 9:35 (311) | Novel metalorganic compounds revealed in meteorites.  
A. Ruf, P. Schmitt-Kopplin |                                                                                                 |

**Winner of Best Dissertation Award from the Astrochemistry Subdivision:** Alexander Ruf

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| 10:25 | Infrared and near-infrared spectroscopy of hot molecules for exoplanets.  
P.F. Bernath |                                                                                                 |
| 11:05 (313) | Inelastic collisions dynamics of optically-centrifuged high-J molecules: Transient spectroscopy beyond the sudden regime.  
A.S. Mulin |                                                                                                 |
| 11:25 (314) | Pyrolysis and matrix-isolation FTIR spectroscopy for characterization of astrochemically significant radicals.  
G.J. Brown, M.J. Ellis, L.R. McCunn |                                                                                                 |

## WEDNESDAY AFTERNOON

**Kinetics & Dynamics**  
L. M. Ziurys, Presiding

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| 1:35 (367) | Rotational and vibrational action spectroscopy of reactive hydrocarbon cations: Intermediates in interstellar carbon chemistry.  
S. Brünken, P. Jusko, O. Asvany, B. Redlich, S. Schlummer |                                                                                                 |
| 2:15 (368) | Metastable atomic spectroscopy (MAS) of the N(DF) atoms using photofragment excitation spectroscopy (PHOFEX) and a slice imaging time of flight mass spectrometer (SI-TOF-MS).  
Y.C. Chang, K. Liu, K. Kalogerakis, C. Ng, W.M. Jackson |                                                                                                 |
| 2:35 (369) | High-resolution photoelectron imaging of C₆H₆ clusters: Towards their possible detection in the interstellar medium.  
G. Kocheril, J.G. Czekner, L. Cheung, L. Wang |                                                                                                 |
| 2:55 INTERMISSION |                                                                 |                                                                                                 |
| 3:25 | IR spectroscopy and ice kinetics.  
K. Oberg, J. Bergner, I. Cooke |                                                                                                 |
| 4:05 (371) | Chirped-pulse microwave spectroscopy in uniform supersonic flows: Isomer-specific branching in photodissociation of propargyl radical.  
B. Broderick, N. Suas-David, N. Dias, A.G. Suits |                                                                                                 |
| 4:25 (372) | Formation of H₂O in space environments.  