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Abstract for an Invited Paper
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**Julius Edgar Lilienfeld Prize (2021): Evolution of Laboratory Astrochemistry of Comets and Other Astronomical Bodies Over the Past Sixty Years**[1]

WILLIAM JACKSON, University of California, Davis

Astrochemistry is the study of the elementary chemical reactions that produce and destroy the molecules observed in astronomy. Sixty years ago, there were only a few atoms, diatomic, and triatomic molecules observed in astronomy. Most of these were in comets such as O, Na, K C2,CN, OH, CO+, OH+, N2+, C3, NH2, and CO2+ through their emission spectra excited by resonance fluorescence of sunlight in the atmosphere surrounding a comet. In this atmosphere there is also gas, dust and magnetic fields. The laboratory studies of the spectroscopy of these species had been known for a long time and it was also known that the atoms and radicals could not be stored for long periods of time, even at liquid He temperatures. If they are not evaporating from the cometary nucleus, how are they being produced? The method of production has to be consistent with the astronomical environment they are found in. I will chronicle how certain laboratory techniques have helped us to determine the precursors of some atoms and radicals observed in comets, planetary atmospheres and other astronomical bodies.

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