

A Comet Unexpectedly Enriched in Organic Molecules

What is the science question? What is the **chemical fingerprint** of Jupiter family comets (JFCs)? JFCs are comets with periods less than 20 years and orbits that do not extend much beyond Jupiter.

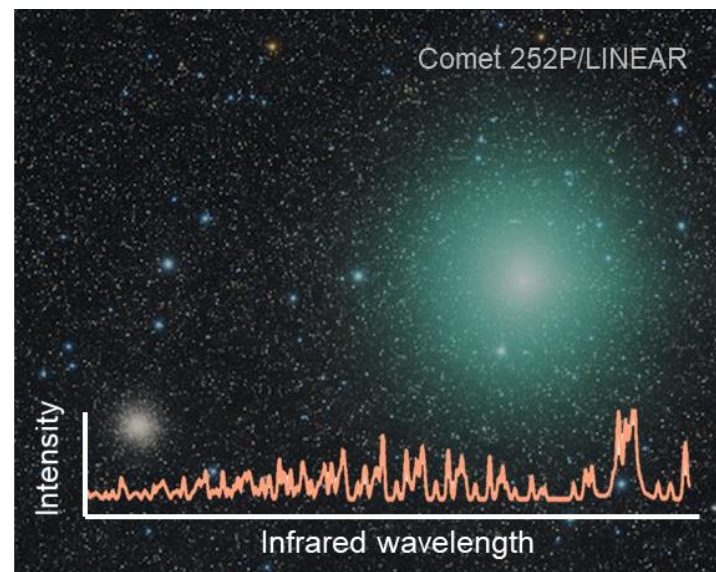
What were your findings? The very close approach to Earth of the comet JFC 252P/LINEAR in April, 2016 allowed us to detect **high levels of methanol and ethane** relative to water vapor in addition to observations of HCN, NH₃, H₂CO, C₂H₂, CO, and CH₄. Observations were made with the Near-infrared Spectrograph (NIRSPEC) at the Keck Observatory, using high-resolution infrared spectroscopy.

What was the impact? JFCs are typically characterized by **somewhat underabundant organics** due to the rapid depletion of their volatiles through multiple trips to the inner Solar System. The unusual excess of methanol and ethane can inform us about this comet's birth and the different physical processes JFCs were exposed to during the early stages of solar system evolution.

Why does it matter to non-scientists? We seek to better understand the composition of comets and their role in the alteration of planets, such as the **possible delivery of organics and water to Earth**.



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The spikes in the intensity of the infrared spectrum shown on top of this comet image represent the presence of high levels of methanol and ethane.



The Keck Observatory (Image: A.R. Hara)

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Reveal Large Abundances of Methanol and Ethane*
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