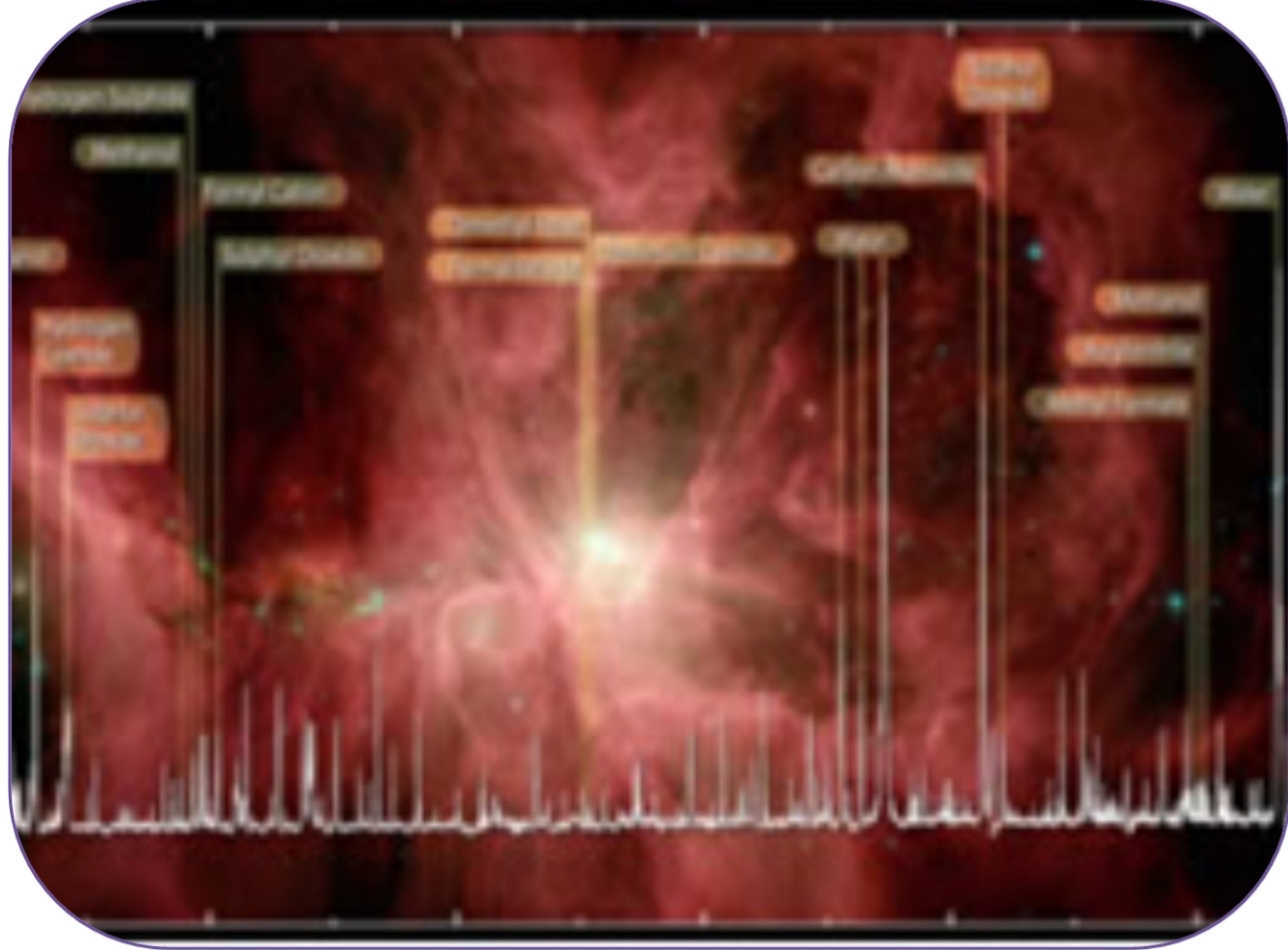


Mysteries of the Universe

Detecting Rare Space Chemicals



With a new generation of space observatories and radio telescopes coming online, astronomers are examining the chemical depths of space with greater detail than ever before. However, rare chemicals can be hard for astronomers to detect through the high levels of methanol and other common molecules found in space. Using the CLS, researchers are building high-resolution spectral fingerprints of methanol. This research can aid astronomers in “pruning out” methanol from their incoming data and learning about more exotic chemicals in space. 🌸

www.lightsource.ca/media/space-metoh.php

The Composition of a Comet



Understanding the composition of comets and meteorites may help scientists to learn more about how the solar system evolved in its early stages and how water and organics were delivered to earth. A very small sample (1 microgram) of Comet Wild 2 was collected by the Stardust spacecraft. Using several synchrotrons including the CLS, researchers were able to determine the distribution of elements within the particles without damaging them. The findings suggest that there has been major mixing of material from inner and outer parts of the solar system in its earliest stages. 🌸

www.physorg.com/news194256127.html
www.lpi.usra.edu/meetings/acm2008/pdf/8347.pdf

Face to Face with our Ancestors



A well preserved hominid fossil - found to be a new species of early human ancestor- has been discovered in South Africa. Using a non-destructive tool called X-ray synchrotron microtomography, scientists have analysed and literally visualized the inside of the fossil block without breaking it open. Preliminary results show details such as fossilized insect eggs and possible brain remnant. In addition, studying the internal growth lines and structure of the teeth could provide the age at death of the individual. Comparing his real age to his developmental level could aid scientists in understanding life over 1.9 million years ago. (ESRF)

www.esrf.eu/news/general/first-studies-of-fossil-of-new-human-ancestor-take-place-at-the-esrf/

Heat Treated Stone Tools



Heating stones was a method used by ancient people to enhance stone workability, easing the transformation into tools. Using the CLS, University of Saskatchewan archeologists found that as the materials were heated, trace elements of titanium, calcium, and iron shifted within the rock. The migration of these trace elements contributes to the increased workability following heating. 🌸

2009 Activity Report, p. 42

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