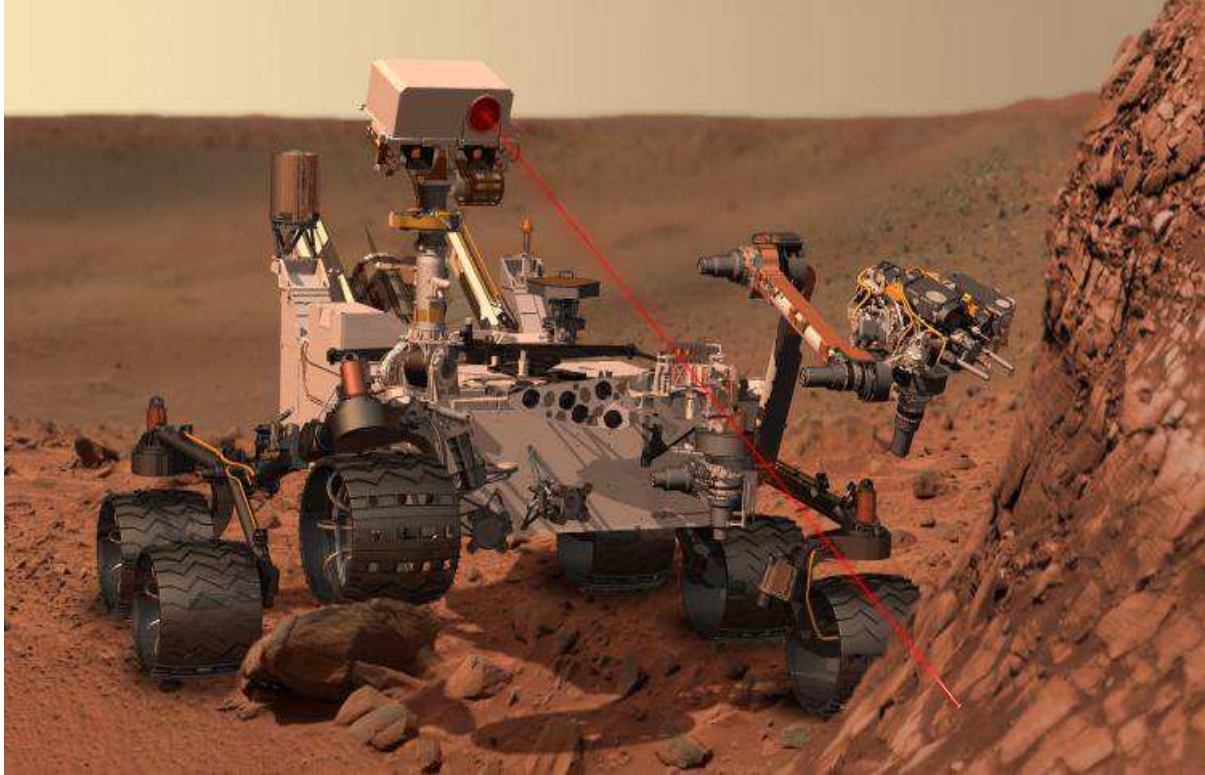


Mars Science Laboratory Application of IR Detectors in Tunable Laser Spectrometers



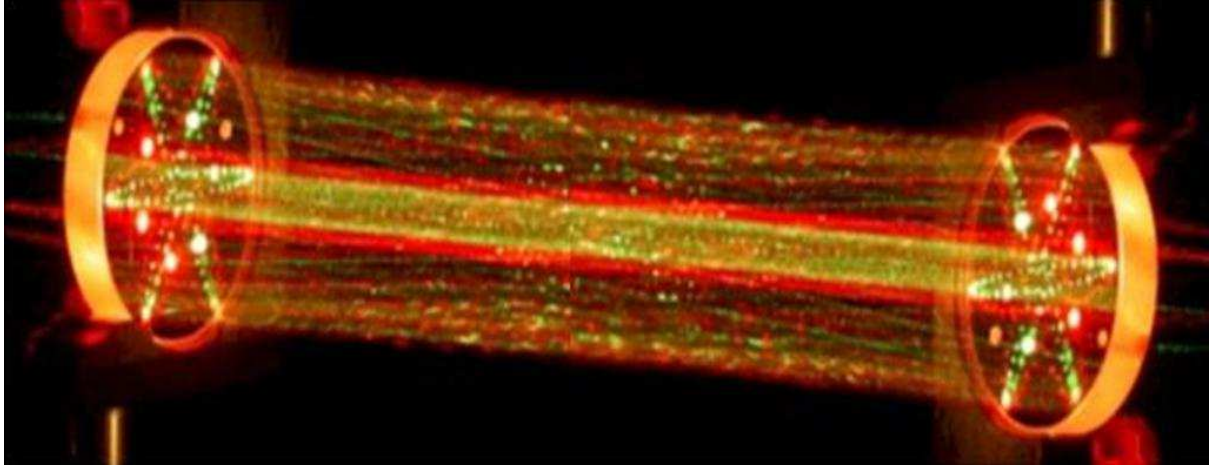
Credit: NASA/JPL-Caltech

The Tunable Laser Spectrometer (TLS) on board the Mars Science Laboratory Curiosity rover, permit measurements of methane, water, and carbon dioxide abundances in the Martian atmosphere and evolved from heated soil samples. At the heart of the tunable laser spectrometer on board Curiosity are the interband cascade semiconductor lasers matched with ir detectors developed at VIGO System. The Herriott cell design spectrometer permits measurements of concentration of :

CH₄ at a wavelength of 3.27 μm , (channel #1)

CO₂ & H₂O at a wavelength of 2.78 μm , (channel #2)

The methane and carbon dioxide measurements provided by the Tunable Laser Spectrometer instrument should provide the essential information needed to answer the question whether Mars ever was an environment able to support microbial life.



Credit: NASA/JPL-Caltech

The above picture shows a lab demonstration of the measurement chamber inside the Tunable Laser Spectrometer. The demonstration uses visible lasers – rather than the infrared ones on the actual spectrometer – to show how the lasers bounce between the mirrors in the measurement chamber.

The TLS shoots laser beams into a type of measurement chamber that can be filled with Mars air. By measuring the absorption of light at specific wavelengths, the tool can measure concentrations of methane, carbon dioxide and water vapour in the Martian atmosphere.

The IR detectors integrated in the Tunable Laser Spectrometer, have been developed and manufactured at VIGO System, the world-wide supplier of uncooled and TE cooled photoconductive, photoelectromagnetic and photovoltaic detectors optimised for any wavelength in the range from 2 to 16 μm (including multi element arrays as well as custom devices).