

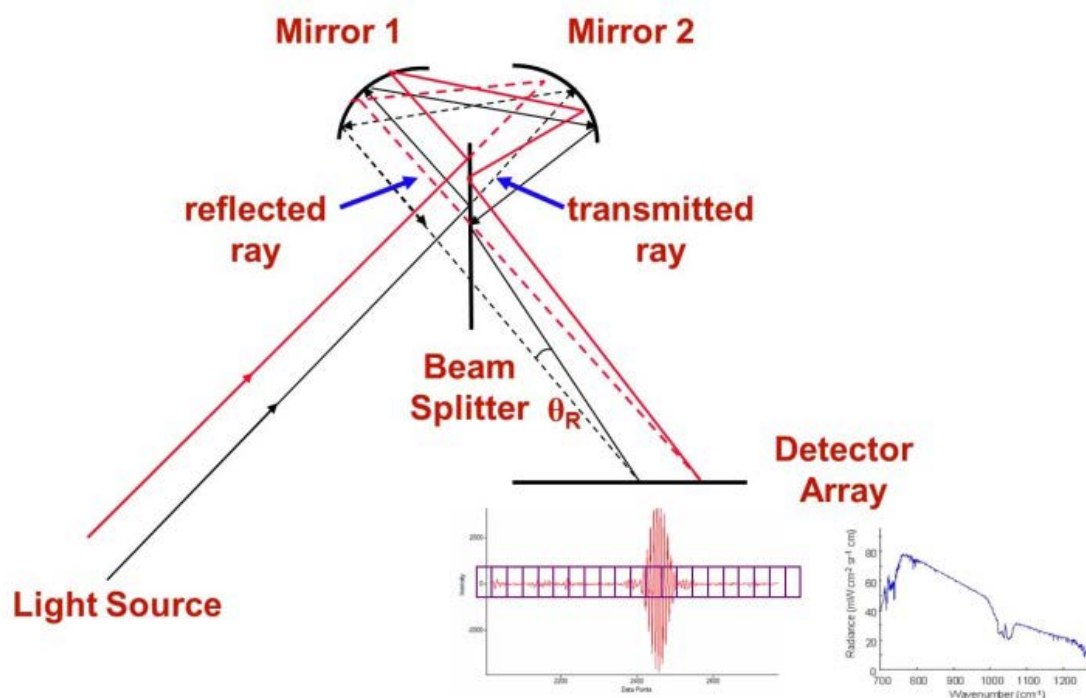
University of Leicester; Greenhouse Gas Point Source Monitoring from Space using Imaging Micro Fourier Transform Spectrometers

Project Summary

Our current knowledge of greenhouse gas (GHG) emissions from localized sources such as power plants, pipeline leaks or oil refineries is insufficient and top-down verification and monitoring methods are urgently needed in support of the world-wide effort of managing and reducing global GHG emissions.

We propose to develop an innovative concept for the monitoring of localized CO₂ and CH₄ emitters based on the robust CH₄/CO₂ ratio method which is suitable for micro satellites or piggy-back missions. This concept will make use of a novel FTS design, based on a static optical configuration, which has been developed at RAL Space. This FTS is an ultra-compact instrument that employs a technique known as Static Imaging FTS (SIFTS) to perform the same function as a Michelson Interferometer.

The main challenge addressed by this proposal will be to assess how best to transfer this technology to the shortwave-infrared considering the driving observational requirements for CO₂ and CH₄ measurements for the application of monitoring localized emitters. The main outcome of this project will be a basic instrument concept, an evaluation of the expected measurement performance and recommendations for further development needs.



A schematic diagram of the optical path set-up, away from the Michelson technique, the mirrors and beam splitter spatially distribute the interferogram onto a detector array, where each element digitally records a point on the modulated pattern, which can be Fourier transformed into a spectrum with no need to scan.