

**Integrated and portable RAMAN-LIBS spectroscopy system**



**MARKET NEED** 

- Quick and complete identification of samples.
- Field and/or laboratory measurements.

**CONTACT**

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**STAGE OF DEVELOPMENT**

- Patented technology.
- Prototype developed (TRL4) being validated at ESA's LUNA facility in Cologne.
- The technology is to be adapted to different applications, with the aim of transfer agreements.

**PORTABLE COMBINED RAMAN-LIBS SPECTROMETER**

Researchers from the Flight Segment Area of the Space Systems Department have developed a spectroscopy system that combines Raman and LIBS techniques in a single portable device.

Spectroscopy takes advantage of the interaction between electromagnetic radiation and matter to obtain the electromagnetic spectrum of materials. In this way it is possible to know aspects of the composition and structure of materials and, ultimately, to identify them.

There are multiple spectroscopy techniques. Depending on the excitation used, molecular or atomic information will be obtained from the sample. The use of a single technique can only provide information on one of them. To complete the study it is necessary to use more than one technique in order to obtain complementary information. However, in heterogeneous samples the application of both techniques on the same point is a challenge due to the difficulties of targeting and sampling compatibility.

The development made at INTA guarantees the sequential measurement of two of these techniques at the same point, Raman spectroscopy (molecular) and LIBS (atomic). Moreover, using a portable system, which can be carried and operated by a single operator. The system incorporates an optical camera, aligned with the two spectroscopic techniques, so that all 3 observe the same point, allowing the operator to select the exact point of the sample on which to perform the analysis. All this results in a complete and fast analysis (<2 min) of the sample without the need to transfer it to the laboratory.

The invention is part of a contract with the European Space Agency for the development of portable instrumentation for in-situ mineralogical analysis by astronauts. Applications are being explored in terrestrial fields, such as geology, mining, raw material analysis, forensic science or NBC analysis.

**ADVANTAGES** 

- Integrated molecular and atomic spectroscopy system.
- Guarantee that the measurement of both techniques is performed at the same point.
- Portable use.
- Fast analysis time from sample detection (<2 min).
- Sequence of measurements can be adapted according to need.

