

EGU22-4474

<https://doi.org/10.5194/egusphere-egu22-4474>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## The search for low-abundant species in the coma of comet 67P/Churyumov-Gerasimenko

**Frederik Dhooghe**<sup>1</sup>, Johan De Keyser<sup>1,2</sup>, Nora Hänni<sup>3</sup>, Kathrin Altwegg<sup>3,4</sup>, Gaël Cessateur<sup>1</sup>, Emmanuel Jehin<sup>5</sup>, Romain Maggiolo<sup>1</sup>, Martin Rubin<sup>3</sup>, and Peter Würz<sup>3,4</sup>

<sup>1</sup>Royal Belgian Institute for Space Aeronomy, Brussels, Belgium (frederik.dhooghe@aeronomie.be)

<sup>2</sup>Center for Mathematical Plasma Astrophysics, KULeuven, Leuven, Belgium

<sup>3</sup>Physikalisches Institut, University of Bern, Bern, Switzerland

<sup>4</sup>Center for Space and Habitability, Bern, Switzerland

<sup>5</sup>STAR Institute, University of Liège, Belgium

During the ESA/Rosetta mission more than 1.5 million individual mass spectra have been obtained in the coma of 67P/Churyumov-Gerasimenko with the ROSINA/DFMS mass spectrometer. A single spectrum at a specific mass represents the accumulation of 3000 scans with an integration time of 6.6 ms, for a 19.8 s total measuring time.

DFMS data has been a source of information on coma composition and even on refractories. Although DFMS has a high sensitivity and high dynamic range, there may still be species hidden in the spectra. One approach to improve the signal-to-noise ratio is the summation of spectra. This way, species with a low abundance, close to the limit of detection of DFMS, should become more pronounced, however, at the cost of the loss of possible time variability information. Unfortunately, the creation of sum spectra is not straightforward. Sum spectra need a clean dataset, where all erroneous and non-cometary data have been removed. Also, instrumental effects (e.g. detector aging, changes in settings in the course of the mission) need to be taken into account.

This contribution will present the methodology and some first results for sum spectra from DFMS. It is shown how this approach can provide inputs in the search for Fe and Ni in comet 67P.