Ices on Mars are ubiquitous and can occur in many ways; e.g. as frost, under the ground or as polar caps. These ices rarely appear in their pure way; instead, they appear as mixtures of water ice, carbon dioxide ice and/or dust.

Instruments like CRISM, OMEGA, HiRISE, and soon CaSSIS [1] look at the Martian surface to identify and quantify icy surfaces through photometry and spectrometry.

Unfortunately, many parameters (like grain size, viewing geometry or relative abundance of ice) define the shape of a spectrum and the brightness of a surface, which supposes a problem for the uniqueness of the inverted data.

According to [2], we would need to acquire at least 390,000 reflectance spectra in the laboratory to understand the influence of each parameter.

In Bern, we measured ~0.01% of those spectra, and this is what we found :)