# Micro-imaging VIS-IR spectroscopy of Martian meteorites in support of the future MaMIss spectrometer measurements

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*Keywords*: hyperspectral microimaging, Martian meteorites, MaMIss, Mars anologues.

In the view of the future ExoMars 2020 mission, an activity of VIS-IR spectral investigations on terrestrial and extraterrestrial Mars Analogues is ongoing, in support of the Ma Miss *in situ* measurements. Ma_Miss is an imaging spectrometer that works in the range 0.4-2.2 μm with 20nm spectral sampling and that will observe the lateral wall of the borehole generated by ExoMars Rover's drill (Coradini et al., 2001). In this abstract, we describe some results about the spectral properties and characterization of mineral grains of the slabs of two Martian meteorites by means of the SPIM imaging spectrometer. SPIM works in the 0.22-5.05 μm spectral range, with a spatial resolution of 38x38 μm on the sample and represents the spare of the spectrometer on Dawn spacecraft (De Angelis et al., 2015). The meteorites investigated are North West Africa 8657 (NWA8657) and Dar Al Gani 489 (DAG489), basaltic shergottites. The average spectrum of the NWA8657 slab, in comparison with spectral measurements on other martian meteorites (Mcfadden & Cline, 2005) shows low reflectance values and 1 and 2 μm spectral absorptions indicating the strong presence of Ca-pyroxenes. The successive pixel by pixel analyses for the pyroxenes spectral speciation showed a great variability of clinopyroxenes in NWA8657. In fact, the 2 μm absorption at longer wavelength in some pixel does not always correspond to the 1 μm feature at longer wavelength. The average spectrum of DAG 489 is marked by a signature typical of low-Ca pyroxenes. Pixel by pixel analyses of DAG489 shows a more homogeneous composition of the pyroxenes characterized by the two major features centered at 0.98-0.99 and 1.98-2 μm. Further spectral absorptions related to sulfates, phosphates and carbonates were detected that are being validated by SEM-BSD to constrain the formation hystories of these two shergottites.

Coradini, A., Piccioni, G., Amici, S., Bianchi, R., Capaccioni, F., Capria, M.T., De Sanctis, M.C., Di Lellis, A.M., Espinasse, S., Federico, C., Fonti, S., Arnold, G., Atreya, S.K., Owen, T., Blecka, M., Bini, A., Cosi, M., Pieri, S., Tacconi, M. (2001): MA_MISS: Mars multispectral imager for subsurface studies. Adv. Sp. Res., 28, 1203-1208.

De Angelis, S., Manzari, P., De Sanctis, M.C., Ammannito, E., Di Iorio, T. (2015): The spectral imaging facility: Setup characterization. Rev. Sci. Instrum., 86, 1-15.

Mcfadden, A. & Cline, T.P. (2005): Spectral reflectance of Martian meteorites: Spectral signatures as a template for locating source region on Mars. Meteor. Planet. Sci., 40, 151-172.