

MASPEX-ORCA: A new GC-MS instrument for Europa Lander

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The MAss Spectrometer for Planetary EXploration-ORganic Composition Analyzer (MASPEX-ORCA) is a compositional analyzer that is being developed for future deployment on Europa Lander or other *in situ* missions to ocean worlds. The primary scientific objective of this investigation will be to search for biosignatures that could be represented in the organic or volatile compositions of surface materials. The instrument is comprised of a sample handling system (under development by JHU-APL), a microfluidics ‘wet lab’ chip (JHU-APL), a microscale gas chromatography system (UM), and a baseline high resolution mass spectrometer (SwRI). The instrument is being designed to process complex mixtures that may contain high concentrations of salts [1,2]. It is also designed to have flexibility in terms of the types of organic compounds that can be analyzed, since the organic composition of Europa is currently unknown. Finally, the use of MASPEX on the backend enables measurements of isotope ratios [3,4], which provides an additional dimension in assessments of the biogenicity of surface materials [5]. This presentation will provide a high-level overview of recent work on development and testing of the MASPEX-ORCA sub-systems.

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References: [1] Brown and Hand (2013), *Astron. J.* 145, 110. [2] Trumbo et al. (2019), *Sci. Adv.* 5, eaaw7123. [3] Hässig et al. (2015), *Planet. Space Sci.* 117, 436-443. [4] Brockwell et al. (2016), *IEEE Aerospace Conference*, DOI: 10.1109/AERO.2016.7500777. [5] Milkov and Etiope (2018), *Org. Geochem.* 125, 109-120.