

MALDI-TOF MS Technology Considerations Relevant to an Exobiology Surface- Science Approach for Europa

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If Europa is to be of primary exobiological interest, namely as a habitat for extant life, it is obvious that: i) a hydrosphere must prevail beneath the cryosphere for a long time; ii) internal energy sources must be present in a sufficient state of activity; and iii) a reasonable technical means must be available for assessing if indeed life does exist in the hypothesized hydrosphere. This discussion focuses on the last point, namely technological issues, because the trend of the compounding evidence about Europa indicates that the first two are highly likely to be true. We present a consideration of time-of-flight mass spectroscopy conducted *insitu* on the cryosphere surface of Europa during a first landed robotic mission. We assert that this is a reasonable technical means not only for exploring the composition of the cryosphere itself, but also for locating any biomolecular indicators of extant life brought to the surface through cryosphere activity. We also describe a MALDI-TOF MS system that we have constructed as a test bed or “proof of concept” prototype for conducting TOF MS measurements on Europa. The operating principles and first results from this instrument will be discussed.

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