

# **LIBS spectroscopy meets the ocean. Chemical analysis of archeological materials in Mediterranean waters**

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After decades of development in laboratories and land operations, chemical analysis of submerged objects is starting to become a reality. While the analysis of water at variable depth has been demonstrated in the past using fluorescence spectroscopy and Raman spectroscopy, determination of the atomic composition of submerged objects is much a more complex task. Technology based on laser-induced breakdown spectroscopy (LIBS) has been recently developed for such sub-sea operations. This paper will discuss the operating parameters of a marine LIBS analyzer. Metals, alloys, rocks, marble, concrete, can be analyzed at a depth of up to 50 m. The system has been tested in several coastal surveys in Mediterranean waters.