

## A BLUETOOTH-BASED WIRELESS CONTROL OF A PORTABLE LIBS SYSTEM

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### ABSTRACT

We describe the development of a Bluetooth-based wireless control for a LIBS (Laser-induced Breakdown Spectroscopy) system that uses a portable prototype Nd:YAG+++ laser with an estimated power of 10MW/cm<sup>2</sup>, a spectrometer with 0.27nm of diffraction resolution and 76.9nm of spectral width. All the prototypes were developed and built in our research institute, the CIOE. We optimized the electronic control circuits, the power supply and the laser battery, thus enabling the reduction in size and weight of the LIBS system. All electronic components were installed on printed circuit boards that were generated on a computer numerical control machine TK-CNC. The system is able to operate with a LIPO (Lithium Polymer) battery as well as with the conventional power grid. We designed and built a first prototype of a measurement gun composed of the laser head, an electronic synchronization system between the laser and the spectrometer sensor (trigger) and an optical data input system for collecting light of radiation-ablated samples. The wireless system allows controlling the portable laser from a computer, enabling to apply changes on the laser operating parameters such as frequency, spark energy and synchronized data capture from the spectrometer. The full system consists of a pulsed laser, a spectrometer and a light collection system; it has a relative low weight (about 6Kg) and is 30% cheaper than similar portable systems.

**Keywords:** Wireless Electronic Control, Bluetooth, Atomic Emission Spectroscopy, LIBS, Láseres.