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# Laser Spectroscopy: A Potential Solution for Versatile Radiocarbon Applications

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Radiocarbon has presented its importance in versatile applications, ranging from dating ancient (in e.g. Quaternary study and archaeology) or modern (in e.g. forensic science) samples, tracing metabolic pathways in human bodies, to determination of bio-/fossil- components (in fuel, fabric, or even emissions of green-house gases and particulate pollution) for environmental considerations. The development of analytical techniques are driven by and meanwhile further inspire these brilliant ideas. Radiation counting dominated in the first 30 years and accelerator mass spectroscopy (AMS) took over since 1970s. Laser spectroscopy on radiocarbon measurements keeps challenging its detection limit (parts-per-quadrillion level in the nature atmosphere) and finally achieved success in 2010, a technique called Saturated-absorption CAvity Ring-down spectroscopy (SCAR) was invented. Through a decade of improvement, SCAR has been commercialized at ppqSense company, with performances are quite close to AMS but costs are much less. Laser spectroscopy offers new opportunities for applications where AMS is too expensive/complicated, or Liquid scintillation counting is inappropriate for sample consumption or time resolution reasons. We are preparing to construct the first laser spectroscopy laboratory for radiocarbon analysis in China and will discuss feasibility and pros-and-cons of the technique in different applications.

## Student Submission

No

**Primary author:** Prof. GUAN, Zuguang (Zhejiang Normal University)

**Co-authors:** Dr BARTALINI, Saverio (ppqSense S.r.l.); Dr LIN, Qiang (Zhejiang Normal University); Ms ZHOU, Yan (Zhejiang Normal University); Dr HAN, Mingming (Zhejiang Normal University); Prof. CHEN, Daru (Zhejiang Normal University)

**Presenter:** Prof. GUAN, Zuguang (Zhejiang Normal University)

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