Level of Confidence for Line Assignment in Spectral Analysis

New software calculates level of confidence for line assignment

Proprietary software from UCF enables higher accuracy and less false positives in spectral analysis software packages for Light Induced Breakdown Spectroscopy (LIBS) systems and other spectrographic applications. Current techniques use peak matching algorithms to identify element lines and concentrations, however, given that peaks are often un-resolvable due to broadening or UTA's, this practice can lead to the incorrect ionic species being matched and false positives. The combination of Level of Confidence (LOC) and calculated transitions in the UCF software provides a more robust means of identification and more accurate results.

Used as either a plug-in to your existing software package or as a stand-alone application, it will provide significantly better identification results from your existing test equipment. This technology has potential applications ranging from quality control, criminal justice, to fundamental spectroscopic research data.

Technical Details
Using a) data from a sample of unknown composition, whose elements, when excited, emit energy as peaks of intensity at wavelengths on a spectrum, and b) entries from a database of spectral peaks recorded as known elements, this innovation calculates probable emitters, elements in the composition of the sample, each with a level of confidence based on probability factors. This software regards a sample's emitted spectrum as a multimodal distribution, comparing peaks to those of corresponding database entries documenting peak intensities of elements at their specific, characteristic wavelengths. Each identified element in the database is then given a probability of generating the spectral line. To these possible emitters, the sample's distribution is normalized to indicate the signal strength of each emitter. The signal strength of the emitters is then calculated, leading to a determination of the level of confidence of emitters for each peak.

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Benefits
- Quantitative data
- Background correction
- Noise reduction
- Minimal resolution requirements

Applications
- Quality control: sample evaluation
- Environmental monitoring: pollutants and contamination
- Criminal justice: evidence evaluation

Tech Fields
Optics & Lasers, Software

Keywords
LIBS, laser, arc, spark, spectroscopy, elemental profiling, software