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Inductively Coupled Plasma Mass Spectrometry: An Ultrasensitive Tool for Ultralow Background Physics

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Since its first development in the mid-1980s, inductively coupled plasma mass spectrometry (ICP-MS) quickly became the ‘gold standard’ for quantitative elemental analysis. Through iterative optimization in design, hardware, and software, ICP-MS continues to provide ever-impressive analytical figures of merit (e.g., sensitivity, resolution, etc.) and, thus, grow in new application arenas. It is particularly useful and now well established in the determination of naturally-occurring long-lived radioisotopes (e.g., U-238, Th-232, K-40) in ultralow background (ULB) rare-event detector materials, and is the focus of this talk. This presentation will briefly describe the basics of ICP-MS before providing some illustrative examples of the strengths and weaknesses of the technique as it relates to ULB material assays. The talk will also focus on how ICP-MS techniques are being employed to meet the stringent radiopurity requirements for current and next-generation ULB experiments.

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