**From Sample to Signal: Laser Produced Plasma as an Analytical Source**

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**Abstract:**

Laser produced plasma play a central role in various analytical methods and techniques for chemical analysis and microanalysis including Laser-induced Breakdown Spectroscopy (LIBS), Laser Ablation-inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS), Pulsed Laser Deposition (PLD), Extreme Ultraviolet Lithography (EUV) and laser spectroscopy. For laser-produced plasma based techniques to emerge as efficient and accurate quantitative analytical techniques, understanding of fundamental processes involved in laser-material interaction, plasma formation, plume expansion and plasma-material interaction is very important. This talk will emphasize on recent research in each of these aspects of laser produced plasmas in the context of relevant physical processes that determine accurate analytical response for quantitative analysis. Several unique and novel applications of laser produced plasmas in conjunction are presented with applications ranging from ambient air monitoring to carcinogen detection to nuclear material applications to biomedical applications. Novel interdisciplinary instrumentation and concepts will be presented showcasing combination of lasers, plasmas with bio-medical engineering concepts.

**Biography:**

**Prasoon Diwakar** completed his undergraduate studies in mechanical engineering at the Indian Institute of Technology, Kanpur. After completing his undergraduate education, he moved to the University of Florida, Gainesville, for his M.S. and Ph.D. in the ME department under the guidance of Dr. David Hahn. During his PhD, he worked on various projects including combustion and Laser Induced Breakdown Spectroscopy (LIBS) and several another analytical techniques. His PhD dissertation focused on understanding plasma–particle interactions with regards to understanding fundamentals of LIBS for qualitative analysis of aerosols. After completing his Ph.D., Dr. Diwakar joined the National Institute for Occupational Safety and Health (NIOSH) as a National Research Council postdoc working on aerosol instrumentation development. Following that, he worked as a research associate at the Center for Materials under Extreme Environment (CMUXE) at Purdue University. At Purdue, his research focused on understanding fundamentals of ultrafast laser ablation processes and their implications on various analytical techniques including LA-ICP-MS and LIBS. Dr. Diwakar joined the ME department at SD Mines in Fall 2018 where he is teaching thermal science courses and conducting research in the field of laser diagnostics, spectroscopy, LIBS, Cold Plasma for biomedical applications and STEM Education.

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