

Optical beam manipulation for laser nanoprinting and integrated devices

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Recent innovations in optical beam manipulation have revolutionized the precision and capabilities of laser nanoprinting and the development of integrated photonic devices. This presentation will explore the cutting-edge techniques and methodologies employed in manipulating optical beams to enhance resolution and functionality in both fields. We focus on the application of spatial light modulators (SLMs) and adaptive optics to control laser beam profiles, enabling unprecedented precision in the nanoprinting of complex, sub-wavelength structures. These advancements facilitate the fabrication of next-generation photonic circuits and components with improved performance and reduced dimensions. Additionally, we will discuss the integration of multifunctional graphene metasurfaces with traditional optical systems to manipulate beam properties such as phase, amplitude, and polarization at a nanoscale level. This integration is pivotal for developing compact, multifunctional photonic devices that can perform better in a variety of optical applications—from telecommunications to medical imaging.



Short Bio:

Distinguished Professor **Baohua Jia** is a Fellow of Australian Academy of Technological Sciences and Technologies (FTSE), a Future Fellow of Australian Research Council and Founding Director of Centre for Atomaterials and Nanomanufacturing (CAN) at RMIT University, Australia.

Before joining RMIT University in 2022, Baohua was a tenured professor at Swinburne University of Technology and Founding Director of Centre for Translational Atomaterials. Professor Jia is a Fellow of Optica (previously known as the Optical Society of America), and a Fellow of the Institute of Materials, Minerals and Mining (FIMMM). Since 2019, Prof. Jia has served as a Colleague of Expert for the Australian Research Council. Professor Jia's



research focuses on the design and optical characterization of novel nanostructures and nanomaterials, fabrication, and efficient conversion and storage of light energy. As a leading Chief Investigator, Professor Jia received a total of more than \$50 million in research funding support. Professor Jia has published more than 300 journal papers with an h-index of 72 (Google Scholar) and developed more than 20 invention patents and patent applications. Based on Professor Jia's outstanding contributions in scientific research, she has won many awards, including the 2017 finalist of the Australian Prime Minister's Science Award, the Vice Chancellor's Industrial Achievement Award in 2011, 2016, and 2018, 2013, Young Science Leader Award, 2012 UNESCO L'Orňal Australia New Zealand Women in Science Award.