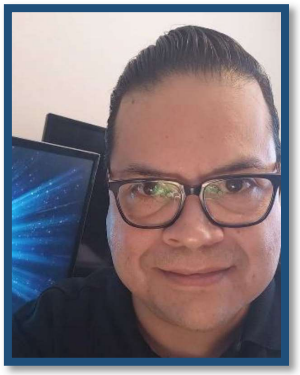
Condensed Matter and Nanotechnology Division

XVI NANOTECH CONGRESS

May 28-31, 2024, GUADALAJARA, MEXICO

NANOPLASMONICS: LOCALIZED CONTROL OF LIGHT PROPAGATION AT THE NANOMETER SCALE



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ABSTRACT

The field of nanoplasmonics has undergone significant progress over the past two decades, particularly in the development of nanoplasmonic devices [1]. This evolution has fueled a growing interest in the conceptualization and realization of 2D optics, a captivating notion that aims to retain the operational speeds of classical optics while enabling the seamless integration of elements at the nanometric scale. This dynamic area of research represents a focal point for cutting-edge investigations. In this context, we delve into a comprehensive exploration of individual nanoplasmonic nanostructures, employing a unified approach encompassing numerical modeling, electron beam lithography (EBL) for manufacturing, and meticulous characterization through advanced optical microscopy techniques[2]. While the adherence to a standardized framework may not be a prerequisite for this research, it presents a noteworthy contribution towards establishing unified criteria. This pursuit is instrumental in steering the trajectory of research endeavors towards the holistic development of an integrated nano-optical circuit. By showcasing a segment of this expansive panorama, we present our achievements in nanoplasmonics and the ongoing discourse towards the realization of a unified and integrated nano-optical future. In this talk, we will present nanoplasmonic elements and metasurfaces that have been subjects of our research. Our exploration will encompass a diverse range of topics, including the design and functionality of different nanoplasmonic devices. Additionally, we will touch upon the advancements in metasurface technology and share insights into our investigations in this exciting realm.[Fig.1].

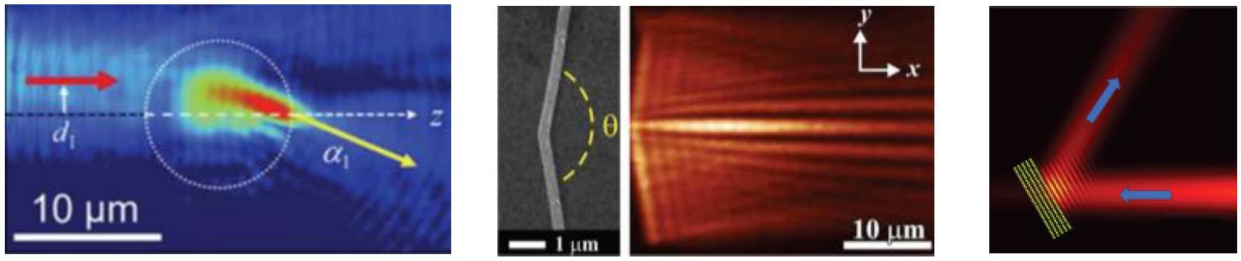

Fig1. Nanoplasmonic devices

[1] S. A. Maier, Plasmonics: Fundamentals and Applications, Springer, New York (2007).
[2] V. Coello, Design and Characterization of Transmissive and Reflective Components for Surface Plasmon Polaritons, SPIE Press, Washington USA(2023).doi: http://dx.doi.org/10.1117/3.2669999