

# *The Physics of Metamaterials Based on Arrays of Metallic Rods*

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Structured materials with unusual electromagnetic properties have received significant attention in recent years after several influential works<sup>1-2</sup> revealed that by tailoring the microstructure of conventional metals and dielectrics it is possible to radically change the propagation of light in such media. Remarkable effects like negative refraction<sup>3-4</sup>, subwavelength imaging<sup>5</sup>, transport of electromagnetic energy through narrow channels and apertures<sup>6</sup>, and cloaking<sup>7-8</sup>, have been theoretically predicted and experimentally demonstrated.

In this talk, I will present an overview of my work in this field, highlight the potentials and the physics of metamaterials formed by arrays of nanowires, and discuss their salient features and future trends. In particular, I will talk about applications such as subwavelength imaging<sup>9</sup>, detection of subwavelength targets, near-field transport<sup>6</sup>, anomalous dispersion of light with low loss<sup>10</sup>, and the possibility of tailoring the strength of the Casimir force.

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