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Optical Characterization of Properties of Split Ring Resonators¹ ROBERTO DE ALBA, KAI WANG, KYONGWAN KIM, ROBERT BAS-SETT, CYNTHIA TRENDAFILOVA, ANDREA BURZO, IGOR LYUKSYUTOV, ALEXEI SOKOLOV, Texas A&M University, TAMU INSTITUTE FOR QUAN-TUM STUDIES COLLABORATION, TAMU SOLID STATE TEAM — Negative index materials (NIMs) are artificially made structures with unit cells smaller than the wavelength of incident light. Conceptually, these materials have the potential to revolutionize current technologies – from allowing us to resolve structures smaller than the wavelength of light, to paving the path towards 'invisibility cloaks'. In the past, these structures have been demonstrated to exhibit a negative index of refraction for microwave frequencies. Today, the goal is to develop structures with these properties in the visible wavelength range, and state-of-the-art research has already led to NIMs with resonances near infrared wavelengths. In this work we investigate the influence of different parameters, including size, material, and substrate on the resonant properties of the split ring resonator structures (SRR). In particular, the use of semiconductor substrates could lead to control of the resonant frequencies due to changes in carrier concentration.

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