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Altri autori (Persone)	EleftheriadesG. V (George V.) BalmainK. G (Keith G.)
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and N. Engheta). -- 10. Dispersion Engineering: The Use of Abnormal Velocities and Negative Index of Refraction to Control the Dispersive Effects (M. Mojahedi & G. Eleftheriades). -- Index.

Sommario/riassunto

Learn about the revolutionary new technology of negative-refraction metamaterials Negative-Refraction Metamaterials: Fundamental Principles and Applications introduces artificial materials that support the unusual electromagnetic property of negative refraction. Readers will discover several classes of negative-refraction materials along with their exciting, groundbreaking applications, such as lenses and antennas, imaging with super-resolution, microwave devices, dispersion-compensating interconnects, radar, and defense. The book begins with a chapter describing the fundamentals of isotropic metamaterials in which a negative index of refraction is defined. In the following chapters, the text builds on the fundamentals by describing a range of useful microwave devices and antennas. Next, a broad spectrum of exciting new research and emerging applications is examined, including: * Theory and experiments behind a super-resolving, negative-refractive-index transmission-line lens * 3-D transmission-line metamaterials with a negative refractive index * Numerical simulation studies of negative refraction of Gaussian beams and associated focusing phenomena * Unique advantages and theory of shaped lenses made of negative-refractive-index metamaterials * A new type of transmission-line metamaterial that is anisotropic and supports the formation of sharp steerable beams (resonance cones) * Implementations of negative-refraction metamaterials at optical frequencies * Unusual propagation phenomena in metallic waveguides partially filled with negative-refractive-index metamaterials * Metamaterials in which the refractive index and the underlying group velocity are both negative This work brings together the best minds in this cutting-edge field. It is fascinating reading for scientists, engineers, and graduate-level students in physics, chemistry, materials science, photonics, and electrical engineering.