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Anisotropic Fabry Perot resonances in Metal-Dielectric Meta-Nano-Layer DAVID KEENE, MATTHEW LEPAIN, MAXIM DURACH, Georgia Southern University — We theoretically propose a new type of mode which exists in a metal-dielectric metamaterial layer of nanoscopic width. These modes exhibit anisotropic dispersion and can be used for strongly directional emission as well as ultra-compact 90 degree polarization rotation. The anisotropic Fabry-Perot (FP) modes appear from regular FP resonances when metal strips are introduced into a dielectric layer forming a metalayer. Each regular FP resonance splits into two anisotropic FP resonances in this situation. In the metalayer structures under consideration with metal fraction of about 0.2 the lower-energy mode of a higher FP mode becomes degenerate with the higher-energy mode of a lower FR resonance and their interference produces transmission of TE polarized waves upon TM incidence from another side, promising 90 degree polarization rotators with dimensions on the order of 100 nm, an order of magnitude smaller than recently proposed by other authors. Although the described behavior is due to the metamaterial-like response of the metal-dielectric strip array the non-local effects in those structures will be discussed.

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