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Emergence of Chirality from Extreme Anisotropy MICHAEL MELVIN, MAXIM DURACH, Georgia Southern University — Metamaterials allow for the engineering of customized responses to electromagnetic radiation. In particular, epsilon-near-zero (ENZ) and epsilon-near-pole (ENP) metamaterials have been designed. Recently it has been shown that thin monolayers of extremely anisotropic metamaterials – ENZ-ENP metasurfaces, formed by metal nanowires - can exhibit polarization conversion over distances of just 30 nm [1]. This is achieved through difference in phase accumulation for fields polarized along ENZ and ENP directions. When Fabry-Perot resonances corresponding to ENZ and ENP cross, the polarization rotation is obtained. In this work we study a chiral metamaterial composed of stacked ENZ-ENP metasurfaces, each rotated with respect to the other. We show that the spectrum of the rotated structure is similar to the spectrum of the structure without rotation, with the exception that instead of crossings, the ENZ and ENP modes feature anti-crossings, which signify their coupling and formation of a novel type of hybrid chiral resonance. These resonances determine the spectroscopic properties of the resulting chiral structure. References: [1] D. Keene, M. LePain, and M. Durach, "Ultimately thin metasurface wave plates," Annalen der Physik, doi:10.1002/andp.201600005 (2016)

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