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## Birefringence swap at the transition to hyperbolic dispersion in metamaterials

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The Bruggeman effective medium is used to study the transition to hyperbolic dispersion of visible light in thin-film metal-dielectric composite metamaterial [1,2] of varying mixing proportion. This transition is experimentally demonstrated by the detection of the swap between the refracted birefringence components in fabricated composites of silver nanowires embedded in anodic aluminium oxide [3]. Three refraction regimes are observed in a single composite using excitation radiation on both sides of the transition [3].

### References:

[1] J. B. Pendry, “Negative Refraction Makes a Perfect Lens”, Phys. Rev. Lett. **85**, 3966 (2000).

[2] R. Shelby, D. R. Smith, and S. Schultz, “Experimental Verification of a Negative Index of Refraction”, Science **292**, 77 (2001).

[3] L. M. Custodio, C. T. Sousa, J. Ventura, J. M. Teixeira, P. V. S. Marques, and J. P. Araujo, “Birefringence swap at the transition to hyperbolic dispersion in metamaterials”, Phys. Rev. B. **85**, 165408 (2012).