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Enhanced superconductivity in aluminum-based hyperbolic metamaterials[1] VERA SMOLYANINOVA, CHRISTOPHER JENSEN, WILLIAM ZIMMERMAN, Towson University, JOSEPH PRESTIGIACOMO, MICHAEL OSOFSKY, HEUNGSOO KIM, NABIL BASSIM, Naval Research Laboratory, ZHEN XING, MUMTAZ QAZILBASH, College of William and Mary, IGOR SMOLYANINOV, University of Maryland — One of the most important goals of condensed matter physics is materials by design, i.e. the ability to reliably predict and design materials with a set of desired properties. A striking example is the deterministic enhancement of the superconducting properties of materials. Recent experiments have demonstrated that the metamaterial approach is capable of achieving this goal, such as tripling the critical temperature Tc in Al-Al2O3 epsilon near zero (ENZ) core-shell metamaterial superconductors [1]. Here, we demonstrate that an Al/Al2O3 hyperbolic metamaterial geometry is capable of a similar Tc enhancement, while having superior transport and magnetic properties compared to the core-shell metamaterial superconductors. [1]. Vera N. Smolyaninova et.al, Scientific Reports 5, 15777 (2015)

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