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Enhanced superconductivity in tin-based hyperbolic metamaterials WILLIAM ZIMMERMAN, SABRINA SEARFOSS, CHRISTOPHER JENSEN, GRACE YONG, VERA SMOLYANINOVA, Towson Univ, JOSEPH PRESTIGIACOMO, M. S. OSOFSKY, Naval Research Laboratory, IGOR SMOLYANINOV, University of Maryland — The search for superconductors with higher Tc is one of the most important problems in condensed matter physics. Recent experiments have demonstrated the enhancement of the critical temperature of a superconductor via the metamaterial approach [1, 2]. Electron-electron interaction in tin/dielectric epsilon near zero (ENZ) metamaterials was enhanced through dielectric response engineering. Here, we extended this approach to a hyperbolic configuration (tin/dielectric multilayers). We have also demonstrated that an aluminum/aluminum oxide hyperbolic metamaterial geometry is capable of Tc enhancement [1]. The dependence of Tc enhancement on metal volume fraction was studied. Polarization reflectometry was used to correlate anisotropy of dielectric function with superconducting properties. [1]. Vera N. Smolyaninova et.al, Scientific Reports 6, 34140 (2016) [2]. Vera N. Smolyaninova et.al, Scientific Reports 5, 15777 (2015).

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