

Abstract Submitted
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Rectenna with broadband operation from near-infrared to visible¹ RAYMOND WAMBOLD, JAMES CHEN, MICHAEL PHILLIPS, ZACHARY SINISI, GARY WEISEL, DARIN ZIMMERMAN, Penn State Altoona, BRIAN WILLIS, University of Connecticut, PAUL CUTLER, NICHOLAS MISKOVSKY, Scitech Associates, LLC — We describe a rectifying antenna (rectenna) for the efficient collection and conversion of solar radiation into electricity. Engineered for broadband absorption, an array of rectennas employs geometric asymmetry, resulting in a self-biased junction that enables a rectified DC tunneling current. To achieve junction gaps within the tunneling regime, we use selective atomic-layer deposition (ALD) applied to devices created using standard electron-beam lithography. We demonstrate the tunability of the optical extinction response in these devices and show that the resonance peak is progressively red-shifted with increasing cycles of ALD, consistent with optical antenna theory. We compare our optical extinction measurements to simulation results and describe electro-optical experiments that are planned for the near future.

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