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Heterostructure designs for photon-enhanced thermionic emission JARED SCHWEDE, DANIEL RILEY, ROGER HOWE, NICHOLAS MELOSH, ZHI-XUN SHEN, Stanford University — Photon-Enhanced Thermionic Emission (PETE) is a promising method of solar energy conversion that relies on photoexcitation and thermionic emission into vacuum, combining quantum and thermal approaches into a single mechanism. We have previously reported a heterostructure design that separates the PETE process from the process of vacuum emission, which resulted in a large improvement in quantum efficiency to 1-2%, compared to 10ˆ4 electrons per photon in proof of concept measurements. In addition to this performance improvement, the heterostructure architecture also creates the opportunity to separately target internal PETE and vacuum emission. In this talk, we describe designs which can be used to independently study these mechanisms.

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