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Extraordinary Optical Absorption through Plasmonic Subwavelength Slits JUSTIN WHITE, Stanford University, GEORGIOS VERONIS, Louisiana State University, ZONGFU YU, EDWARD BARNARD, ANU CHANDRAN, SHANHUI FAN, MARK BRONGERSMA, Stanford University — We report on the ability of resonant plasmonic slits to efficiently concentrate electromagnetic energy into a nanoscale volume of absorbing material placed inside or right behind the slit. This gives rise to extraordinary optical absorption (EOA) characterized by an absorption enhancement factor that well-exceeds the enhancements seen for extraordinary optical transmission (EOT) through slits. A semi-analytic Fabry-Perot model for the resonant absorption is developed and shown to quantitatively agree with full-field simulations. We show that absorption enhancements of nearly 1000% can be realized at 633nm for slits in aluminum films filled with silicon. This effect can be utilized in a wide range of applications, including high speed photodetectors, optical lithography and recording, and biosensors.

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