Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Tests and Analysis of Electromagnetic Models for Semiconductor-Metal Quantum-Well Lasers MENG-MU SHIH, University of Florida — This work tests the proposed electromagnetic models for quantum-well lasers by using several materials of semiconductors and metals. Different combinations of semiconductors and metals can generate various wavelengths and mode-couplings in such semiconductor waveguide structures with built-in metal-gratings. The numerical results of these models are computed by the photonic approach and verified by the optical approach. Even for the weak mode-coupling cases, the numerical results computed by both approaches have close values. Numerical results with post-analysis can summarize how the key parameters, such as grating geometry, well thickness, and layer thickness, affect the mode-couplings. The above results can be further interpreted by physics intuition and fundamental concepts so as to provide insights into the modeling and design of lasers for more applications.

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Date submitted: 06 Jan 2012 Electronic form version 1.4