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VCSEL-based CPT atomic clock: Understanding the magic modulation index MICHAEL CRESCIMANNO, Youngstown State University, IRINA NOVIKOVA, YANHONG XIAO, DAVID PHILLIPS, RON WALSWORTH, Harvard-Smithsonian Center for Astrophysics — Since the earliest VCSEL-based CPT experiments [1] it has been known that there are modulation regimes that allow the measured clock frequency to be largely independent of laser intensity. We describe a quantum optics model of the VCSEL-based CPT clock and compare the model to recent experimental lineshape data. This is part of a stringent test of the computation of coupled channel AC stark effects in multiphoton processes.

[1] Vanier, J., A. Godone, F. Levi, S. Michalizio, "Atomic Clocks Based on Coherent Population Trapping: Basic Theoretical Models and Frequency Stability," Proceedings of the 2003 IEEE International Frequency Control Symposium, Pg. 2-14.

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