

Abstract Submitted  
for the DAMOP09 Meeting of  
The American Physical Society

**Compact atomic clock prototype using a Rb vapor cell and a vertical cavity surface emitting laser** EUGENIY MIKHAILOV, NATHAN BELCHER, IRINA NOVIKOVA, The College of William&Mary — Development of compact power efficient atomic clock is a crucial step to improve consumers navigation systems. Low-threshold vertical cavity surface emitting lasers (VCSEL) generate a single spatial mode and can be modulated at very high RF frequencies, making them ideal light source for atomic clocks based on electromagnetically induced transparency (EIT) and other coherent effects in atoms. However, large phase noise (in the order of several hundreds megahertz) of a typical VCSEL couples into the atomic medium and degrades short term stability of an atomic clock. We discuss the optimal power regime to minimize this effect as well as other ways to improve long term stability of the clocks.

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Date submitted: 23 Jan 2009

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