

Abstract Submitted  
for the DAMOP06 Meeting of  
The American Physical Society

**Amplitude and Phase Control of Direct Frequency Comb Spectroscopy by Atomic Filter** GORAN PICHLER, HRVOJE SKENDEROVIĆ, DAMIR AUMILER, TICIANA BAN, Institute of Physics, Bijenička cesta 56, Zagreb, Croatia, MARIN PICHLER, Department of Physics, Goucher College, Baltimore MD — Frequency comb may be virtually seen in the direct observation of the velocity selective optical pumping of the rubidium ground state hyperfine levels induced by a train of femtosecond pulses <sup>1</sup>. The accumulation effects can be easily observed by using a weak cw scanning probe laser transmitted collinearly with the femtosecond laser centered on the D2 or D1 resonance lines. However, if the high repetition frequency comb obtains phase and amplitude changes within the Rb hyperfine components, then the Doppler profile will exhibit additional changes. When all the frequency comb lines within the hyperfine structure are completely absorbed the velocity selection will be entirely removed. Experiments with Doppler broadened rubidium hyperfine lines illuminated by the femtosecond laser beam modified by another atomic filter (Rb vapor filled sapphire cell) will be presented and discussed.

<sup>1</sup>D. Aumiler, T. Ban, H. Skenderović, G. Pichler, Phys. Rev. Lett. 95, 233001 (2005)

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Date submitted: 31 Jan 2006

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