FREE-INDUCTION DECAY SIGNALS USING A VOLTAGE MODULATED QUANTUM CASCADE LASER

G. DUXBURY and N. LANGFORD, *Department of Physics, SUPA, John Anderson Building, University of Strathclyde, 107 Rottenrow, Glasgow G4 0NG, Scotland,UK*.

Pulse modulated, continuously operating, quantum cascade, QC, lasers have been used to probe the infrared spectra of nitrous oxide and nitric oxide. We have extended the method of solving the Maxwell-Bloch equations numerically, which was developed for pulsed QC lasers, to include the dual sweep rate behaviour seen in pulse modulated lasers. Using this approach we have demonstrated that two types of rapid oscillatory signals should be observed, free induction decay signals which occur at the beginning and end of the excitation pulse, and rapid passage induced signals. Rapid passage signals only occur if the frequency swept pulse scans towards the centre frequency of the absorption line. Oscillatory structure may then be observed both during the excitation pulse, and during the relaxation time period required for the laser to reach equilibrium following the end of the excitation pulse.