All-collinear FAST CARS on gases[1] ANTON SHUTOV, Texas AM University, DMITRY PESTOV, Biophotonic Solutions, Inc., XI WANG, The Methodist Hospital System, ARIUNBOLD GOMBOJAV, Mississippi State University, ALEXEI SOKOLOV, Texas AM University, MARLAN SCULLY, Baylor University, Texas AM University — The femtosecond adaptive spectroscopic technique for coherent anti-Stokes Raman spectroscopy (FAST CARS) aims to optimize the laser-pulse configuration for rapid detection and identification of chemicals. Using two ultrashort Stokes-pump preparation pulses in combination with a narrowband delayed probe pulse, provides perfect non-resonant four-wave mixing background suppression. For this reason, one can choose the time delay for the tailored probe pulse such that it overlaps the preparation pulses at the node. The high usability of the FAST CARS allows for real-time monitoring of various gases, for example, CO_2, O_2 and N_2 concentrations in air. In our experiments, we used obtained CARS signal for O_2 in the ambient air and in the test cell to perform various measurements. Oxygen cross-sections of CARS spectrogram were obtained, additionally we made concentrations measurements of oxygen and nitrogen mixture. Finally, it was shown how CARS signal can be used for imaging gas flow.

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