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Development of Picosecond Electric Field Measurement by Coherent Four Wave Mixing WALTER LEMPERT, BEN GOLDBERG, Ohio State University, SEAN O'BYRNE, University of New South Wales, IGOR ADAMOVICH, Ohio State University — The development of a four wave mixing based, sub-nanosecond temporal resolution optical diagnostic for determination of electric field is presented. The method utilizes a high pressure hydrogen stimulated Raman shifting cell to produce a pump/Stokes beam pair from an input approximately 30 picosecond laser pulse at 532 nm. When the pump/Stokes beam pair is focused into a hydrogen containing discharge a coherent IR beam is generated at the wavelength corresponding to the fundamental hydrogen vibrational mode, 2.4 microns, the intensity of which is proportional to the square of the external field component parallel to the polarization of the input laser beams. Initial results have demonstrated field resolution of a few hundred volts/cm at 1 bar hydrogen pressure. The temporal resolution is limited by the relaxation time of the coherence induced by the pump/Stokes beam pair, the functional dependence of which upon pressure will be presented, along with characterization of the efficiency of the Raman shifting cell and a comparison of the sensitivity obtained using three different IR detectors.

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