STUDY OF TWO-PHOTON RESEONANT FOUR WAVE SUM MIXING IN XEON AND ITS COMPETITION WITH THE FOUR WAVE DIFFERENCE MIXING

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The two-photon resonant four wave sum- and difference-mixing in Xe gaseous medium was studied by subjecting a variety of molecular samples, including acetone, furan, triethylamine (TEA), and dimethylsilacyclobutane (DMSCB), to the laser sources produced from the four wave mixing processes for ionization. Ionization of acetone-h6, acetone-d6, furan-h4, furan-h4, and DMSCB samples showed similar behaviour. It is demonstrated that in a vacuum ultraviolet (VUV) spectral region of 103 - 109 nm four-wave sum mixing in Xe can only occur in ten discontinued regions, all of which are to the blue of a Xe atomic transition. Study of the TEA sample with its ionization potential lower than the photon energy of the VUV radiation from the difference mixing illustrated the competition between the sum- and difference-mixing occurring simultaneously in the Xe gas cell.