DUAL-COMB SPECTROSCOPY OF THE ν_1 + ν_3 BAND OF ACETYLENE: INTENSITY AND TRANSITION DIPOLE MOMENT

KANA IWAKUNI^a, Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan; SHO OKUBO, National Metrology Institute of Japan (NMIJ), Ntional Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; KOICHI MT YAMADA, Institute for Environmental Management Technology (EMTech), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; HAJIME INABA, ATSUSHI ONAE, National Metrology Institute of Japan (NMIJ), Ntional Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; FENG-LEI HONG, Department of Physics, Yokohama National University, Yokohama, Japan; HIROYUKI SASADA, Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan.

The $\nu_1 + \nu_3$ vibration band of ${}^{12}C_2H_2$ is recorded with a homemade dual-comb spectrometer ^b. The spectral resolution and the accuracy of frequency determination are high, and the bandwidth is broad enough to take spectrum of the whole band in one shot. The last remarkable competence enables us to record all the spectral lines under constant experimental conditions. The linewidth and line strength of the P(26) to R(29) transitions are determined by fitting the line profile to Lambert-Beer's law with a Voigt function. In the course of analysis, we found the ortho-para dependence of the pressurebroadening coefficient ^{cd}. This time, we have determined the transition dipole moment of the $\nu_1 + \nu_3$ band. It is noted that the transition dipole moment determined from the ortho lines agrees with that from the para lines.

^apresent address; JILA, University of Colorado, Boulder, CO, USA

^bS. Okubo et al., Applied Physics Express 8, 082402 (2015).

^cK.Iwakuni et al., 71th ISMS, WK15

^dK. Iwakuni et al., Physical Review Letters <u>117</u>, 143902 (2016).