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Time and wavelength resolved measurements of the VUV excimer emission generated in a windowless dielectric barrier discharge (DBD) in argon RAJESH GANESAN, DEBORAH KANE, ROBERT CARMAN, Department of Physics and Astronomy, Macquarie University, Sydney, Australia — Temporal analysis of the VUV emission from a windowless dielectric barrier discharge [1] in pure argon from 50-800 mbar were carried out to gain insight into the underlying kinetic processes relating to the first and second continuum emission bands of the Ar_2* excimer. Pulsed excitation using bi-polar voltage pulses with 2% duty-cycle and 32kHz repetition frequency were employed to achieve a uniform discharge with well-controlled electrical breakdown characteristics. By comprehensively measuring the rising and decay time constants for ∼50 individual wavelengths within the first and second continuum of argon covering the range λ=107nm-140nm, the dominant collisional and radiative rates relating to Ar_2* excimer production and loss have been obtained. The variation of time constants as a function of wavelength and gas pressure has been determined. The VUV emission curves at the transition phase between the first and second continuum have been analyzed in detail. [1] R J Carman et al., J.Phys.D:Appl.Phys, 43, 025205 (2010).

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