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On UV emission developing during luminous phase of nanosecond discharges in liquid water.[1] MILAN SIMEK, VACLAV PRUKNER, JIRI SCHMIDT, PETR HOFFER, Institute of Plasma Physics, Czech Academy of Sciences — There is no clear experimental evidence of the underlying microscopic mechanisms of micro-discharges produced by high-voltage pulses of nanosecond duration in liquid water. In this work, we examine plasma-induced emission (PIE) to reveal basic spectrometric characteristics of developing luminous phase of the discharge in the UV spectral range with temporal resolution of 100 ps. We present a viable approach for conducting well-designed and well-defined experiments for acquiring the PIE in the 200-320 nm spectral window. We reconstruct basic UV signatures through the analysis of the PIE waveforms acquired using an ultrafast photomultiplier and complemented by emission spectra acquired by the ICCD spectrometer. We establish that the UV emission produced during the luminous phase comes exclusively from luminous filaments developing in bulk liquid and is characterized by a broad peak occurring between 255-275 nm. Additionally, this study contributes to the progress of the PIE analysis and provides further insight into the basic radiative processes occurring during the luminous discharge phase in liquid water.

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