Timing Control of Self-organized Dielectric Barrier Discharge and Influence of Discharge Driving Frequency\textsuperscript{1} JUNICHI SUGAWARA, Iwate University, YUKI KUBOTA, None, HIDENORI OKI, SEIJI MUKAIGAWA, KOICHI TAKAKI, Iwate University — The two-dimensional array of filaments generated by the self-organizing of atmospheric dielectric-barrier discharges has plasma photonic crystal applications. The net generation time for the self-organization of discharge in one cycle is expected to be short because of its self-extinguishing feature, but that did not happen. However, we attempted to shorten the net generation time by implementing a time difference to drive the parallel array discharge units. The timing of the voltage applied to the discharge cells was controlled by the metal-oxide-semiconductor field-effect-transistors of the circuits, which were turned on by a signal from a single peripheral interface controller. The resultant duty cycles of the discharge current duration per cycle were 6\% (single cell), 12\% (two parallel cells), and 27\% (three parallel cells). When the frequency was changed from 100 to 300 kHz, the generation time increased from 0.61 to 0.72 \(\mu\text{s} (100 \text{ kHz})\), 0.91 to 1.23 \(\mu\text{s} (200 \text{ kHz})\), and 1.54 to 1.91 \(\mu\text{s} (300 \text{ kHz})\). According to these results, frequency and maintenance time are proportional.

\textsuperscript{1}This work was supported by JSPS KAKENHI Grant Numbers 26390094, 24540530.