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Measurement of electric field generated by high power burst pulse electromagnetic wave in water for using to application to bioelectrics

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Nanosecond and sub-nanosecond high voltage pulses can provide new applications. A cancer treatment by an ultra-short pulse high electric field is one of them. High power pulsed electromagnetic wave has been proposed to apply the high electric field for that treatment [1]. Therefore we are developing a high power burst pulse electromagnetic wave generator for bioelectrics application [2]. In this work, we have measured the electric field generated by electromagnetic wave in water as a phantom experiment. The electric field generated by electromagnetic wave in water has been measured by an optical method. The optical method has employed the Kerr effect of water. This method can measure the fine electric field distribution at one time by the use of a laser. As a result, we have been able to measure focused electromagnetic wave electric field of 25 kV/cm in water. This result has corresponded to a measurement result of electric field using a probe.

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[2] Y. Minamitani, T. Ueno, Y. Ohe, S. Kato, "Intensity of Electric Field Radiating from High-power Pulsed Electromagnetic Wave Generator for Use in Biological Applications", IEEE Transactions on Dielectrics and Electrical Insulation, Vol. 17, No. 6, pp. 1895-1900 (2010)

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