

# Measurement of the voltage evolution on a load of X-pinch plasma system using the Pockels effect

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A measurement system using the Pockels effect (linear electro-optic effect) is developed to measure a voltage on a load of the SNU X-pinch device [1]. The sensor part of the measurement system consists of an EO(electro-optic) crystal, whose refractive indices are effectively changed due to the Pockels effect when an external electric field is applied to the crystal, and its mount. As the EO crystal is small in physical size and can withstand high electric fields, the sensor can be located close to the load of the X-pinch system to measure the voltage evolution on the load. The sensor part is completely isolated from all the other components of the measurement system, and it induces a change of the polarization state of the incident laser beam. This allows all the electronic devices to be separated and shielded from the high electric pulses generated by the X-pinch system. We present the configuration of the voltage measurement system that uses Lithium niobate crystals as one of the EO crystals and the measurement results from the different types of the loads such as single wire and X wire cases. Also, we discuss the temporal evolution of the voltage especially during the wire expansion and pinching stage of the X-pinch plasmas.

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