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The effect of the Crystal Geometry and Photorefraction to Electro-optic field sensors DONG HO WU, Naval Research Laboratory, ANTHONY GARZARELLA — For the development of electro-optic (EO) field sensors we have investigated the EO response of several Lithium Niobate and Strontium Barium Niobate crystals. The EO responsivity is greatly affected by the spatial variation of the refractive index induced by the photorefractive effects. For a Lithium Niobate crystal, with which the photorefractive effect is negligibly small, the detector output signals could be accurately modeled by assuming a beam of coherent phase. For a strongly photorefractive Strontium Barium Niobate crystals, we need to modify the model using a distribution function for the phase of polarization to reconcile our model with the data. Such distributions were evident through spatial-temporal instabilities of the detector signals. While the modeled distribution of the polarization phase which fits the data corresponds to refractive index variations of only 10^{-5}, the impact on the EO detector sensitivity can be devastating. We will discuss our detailed experimental results on the EO and photorefractive materials.

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