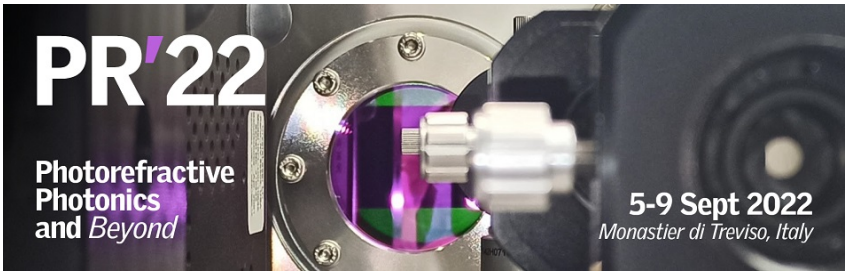

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Three modes of the nonstationary holographic current excitation in a gallium oxide crystal

Thursday 8 September 2022 16:40 (1h 30m)

Monoclinic gallium oxide β-Ga_2O_3 demonstrates an interesting combination of physicochemical parameters which advance its application in modern electronics and optics. The crystal with the band gap of ~ 4.8 eV is transparent in the range from visible to near UV light, that is why the material is suitable for the implementation of solar-blind detectors of deep ultraviolet radiation. The material is characterized by the high breakdown field (6-8 MV/cm), moderate electron mobility and good thermal stability, which make it very engaging for production of radio frequency and power field-effect transistors, as well as Schottky rectifiers.
Recently we applied the non-steady-state photo-EMF technique for characterization of β-Ga_2O_3 crystal in the green spectral region. In this research we continue the investigations of β-Ga_2O_3 at $\lambda = 457$ nm. The material demonstrates insulating properties and high transparency for the chosen wavelength, but this, however, does not prevent the dynamic space-charge grating formation and the holographic current observation for various external electric fields - zero, dc and ac ones. These recording modes correspond to the non-local and local response of a photosensitive medium, thus their joint investigation is of great importance for a better understanding of photoelectric phenomena and utilization scopes for the studied material. The holographic current amplitude is measured and analyzed versus the frequency of phase modulation, spatial frequency and electric field value. The main photoelectric parameters such as specific photoconductivity, sensor responsivity and diffusion length of carriers are determined for the blue region of spectrum.

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