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Polarized Raman Spectroscopic Study of $ZnGeP_2$ RAMAZAN ATALAY, GOKSEL DURKAYA, NIKOLAUS DIETZ, Department of Physics and Astrronomy, Georgia State University, Atlanta GA. 30303 — The ternary semiconductor $ZnGeP_2$ alloy is one of the most technologically important material systems among the II-IV-V_2compound family since it is promising in device applications based on non-linear optics. In order to employ ZnGeP2 material system in device applications such as; frequency doubling, parametric optical amplification, second order differential frequency coupling, the $ZnGeP_2$ crystal structure must have an oriented distortion that results in birefringent effect. The orientation of the distortion in the crystal structure can be promoted into a preferred direction so that only one plane of the crystal becomes birefringent. In this study, we present detailed study of the polarization dependent behavior of the phonon modes in ZnGeP2 crystal using Polarized Raman Spectroscopy (PRS). The results of our studies demonstrate nonlinear mixing of radiation only occurs in the crystalline plane where conservation of momentum or so-called phase matching is present. The effect of birefringence in phonon modes of $ZnGeP_2$ crystal in Raman spectra is studied.

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