

Experimental Observation of Temperature Dependence of Circular Photogalvanic Effect in GaAs/Al_{0.3}Ga_{0.7}As Heterostructures

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We report on the investigation of near-infrared radiation induced circular photogalvanic effect (CPGE) in a two-dimensional electron gas (2DEG) formed in a (001)-oriented GaAs/Al_{0.3}Ga_{0.7}As heterostructures with 1ML InAs inserting layer at the interface from liquid nitrogen temperature up to room temperature. We observe a sign inversion of the CPGE current at 140 K and 170 K. Since the CPGE is often related to the structure inversion asymmetry, which is insensitive to the temperature, we suggest that there is other physical origins that give rise to the CPGE current. We also study the temperature dependence of the photoconductivity and the capacitance of the sample in order to better understand the anomalous phenomenon.