

## Radiation modulation effect of circular photogalvanic effect in two-dimensional electron gas system

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We report on the observation of a modulation on the circular photogalvanic effect (CPGE)<sup>1</sup> imposed by an extra optical radiation in a GaAs-based two dimensional electron gas system. The wavelength of the radiation for exciting the CPGE is 1064 nm and the wavelength of the modulation is 532 nm. The experiment is carried out from 77 K up to room temperature. The 1064 nm induced CPGE modulated by the 532 nm radiation increases as the increasing temperature. We also vary the power of the modulation beam to investigate the intensity dependence of the modulation effect. The modulation exhibits a linear dependence at low intensity. As the intensity increasing, we observe a saturation at certain level of the intensity and a suppression of the modulation when the intensity is further increased. The investigation of photoconductivity reveals that the change of the photoexcited charge carrier density has little contribution to the radiation modulation effect. Therefore, the microscopic mechanism of the radiation modulation effect can be attributed to the modulation of spin-orbit interaction in the structure.

<sup>1</sup>S.D. Ganichev and W. Prettl, Journal of Physics-Condensed Matter, **15**, R935-R938 (2003).