Experimental Determination of Space-Charge Electric Field in Photorefractive Multiple Quantum Wells XIANGXUE ZHANG, College of Science, Beijing Forestry University, Beijing,100083, China, MOHAMMAD SAMI-ULLAH, Department of Physics, Truman State University, Kirksville, MO 63501, PING YU, Department of Physics and Astronomy, University of Missouri, Columbia, MO 65211 — We present a method for deducing the space-charge electric field in a photorefractive multiple quantum wells (PRQW) illuminated by two coherent beams under drift-current dominant conditions where the phase difference between the space-charge electric field and light intensity is predicted to be π radians. Firstly, we determine a relation $J_0(E_0,I_0)$ for the device between the total current J_0, constant applied electric field E_0 and uniform intensity I_0. When the intensity inside the PRQW varies sinusoidally, substituting current for J_0 and maximum intensity for I_0 in $J_0(E_0,I_0)$ yields E_0, which corresponds to the minimum of the net electric field under the assumption that intensity is uniform near maxima and minima. A similar procedure is used to deduce the maximum value of the net electric field inside PRQW. Subtracting the applied electric field from the net electric field yields the space-charge field.

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