"Photocurrent without photo-induced carriers"

Photo-induced current is an important phenomenon from the viewpoint of both the fundamental physics and applications to solar cell and photodetector. Recently, geometric nature of the photocurrent of bulk-origin in noncentrosymmetric quantum materials attracts lots of attention both theoretically and experimentally. In this talk, I will discuss that this geometric current is analogous to the polarization current in ferroelectrics [1-3], and does not require the charge carriers excited by the light. It is induced by the exciton [4] and even the virtual inter-band transitions which is coupled to the magnon [5] and phonon [6,7].