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2D Fano-resonances in momentum space WAI-LUN CHAN, JOHN TRITSCH, ANDREI DOLOCAN, XIAOYANG ZHU, University of Texas at Austin — Using the model system of molecular quantum wells and image potential states at the C_{60}/Au(111) interface and the experimental technique of time- and angle-resolved two photon photoemission spectroscopy, we probe many body interaction in coupled two-dimensional (2D) systems. Transiently populated 2D bands with different effective masses are found to intersect with each other in the reciprocal space. At the points of intersection, we observe strong modulations in the photoemission intensity as a function of parallel momentum vector. The intensity modulation in the reciprocal space can be explained by the well-known Fano resonances – the interference between different quantum mechanical pathways in optical excitation. The experimental results agree semi-quantitatively with simulation based on optical Bloch's equations. Differing from conventional Fano resonances in energy space, our observation establishes the existence of 2D Fano resonance in momentum space.

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