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Breakup of Quasiparticles in Thin-Film Quantum Wells S.-J. TANG , L. BASILE, T. MILLER, T.-C. CHIANG, University of Illinois at Urbana-Champaign — Quantum well states in thin films are commonly described in terms of a quasiparticle confined in a quantum box, but this single-particle picture can fail dramatically near a substrate band edge, as shown by this angle-resolved photoemission study. Atomically uniform Ag films are prepared on Ge(111) to facilitate accurate line shape and dispersion relation measurements. A quantum well peak is observed to split into two peaks near the Ge valence band edge. The unusual line shapes are shown to be due to many-body interactions and are quantitatively explained by a Green's function calculation.

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