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Umklapp-Mediated Quantization of Electronic States in Ag Films on Ge(111) SHU-JUNG TANG, YEN-RU LEE, SHIH-LIN CHANG, National Tsing Hua University, THOMAS MILLER, TAI-CHANG CHIANG, University of Illinois at Urbana-Champaign — We employ angle-resolved photoemission to study the electronic structure of atomically uniform films of Ag grown on Ge(111). A new kind of quantum well state is observed near a specific emission direction away from the surface normal. In contrast with the usual quantum well state arising from electron confinement by specular reflections at the surface and interface of the film, the new kind involves retroreflections, or umklapp reflections, at the interface. It requires four reflections, instead of the usual two reflections, to complete a coherent interference path.

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