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Transverse Fracture Bands during Rapid Peeling of Adhesive Tape S.T. THORODDSEN, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia, H.D. NGUYEN, K. TAKEHARA, T.G. ETOH, Kinki University, Osaka, Japan — The typical roll of *Scotch* tape consists of sticky acrylic adhesive attached to an acetate film, with a total thickness of 58 μm. When this adhesive tape is peeled from a solid surface, the detachment occurs with a well-known stick-slip mechanism accompanied by a characteristic ripping sound. Here we present direct ultra-high-speed video imaging of the detachment zone when Scotch tape is peeled off at high speed from a solid glass surface. The tape is manually pulled from the surface at very large velocities between 4 - 14 m/s and is viewed through the substrate, with a long-distance microscope. The video imaging at 1 million fps reveals a highly regular substructure of transverse fractures, which appear during the slip phase. The typical 4 mm-long slip region has a regular substructure of transverse 220 μm wide slip bands, which fracture sideways at speeds over 300 m/s. Our imaging can observe the growth and relaxation of cavitation bubbles within the adhesive layer. The fracture tip emits waves, which travel up the detached section of the tape at $\sim$ 100 m/s. We believe this promotes the sound, so characteristic of this phenomenon.

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