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Relaminarization under stationary vortices ROBERT BREIDENTHAL, University of Washington — Flow visualization reveals that a turbulent boundary layer is relaminarized when stationary streamwise vortices are introduced. Following a suggestion of Balle, the vortices are stabilized by large streamwise "Karman" grooves in a wavy wall. In a water tunnel, upstream vortex generators place a large streamwise vortex in the middle of each groove, at the stationary point where Prandtl's vortex force vanishes. According to a theory by Cotel, the wall fluxes of a turbulent boundary layer should decline to laminar values under such "persistent" vortices. The observed relaminarization is consistent with this theory and with previous measurements of heat transfer by Touel and Balle. However, the structure of the transverse flow resembles the cats-eye pattern of a temporal shear layer rather than the anticipated von Karman wake. The cats-eye pattern corresponds to the forced shear layers of Oster-Wygnanski and Roberts, who found that the Reynolds stresses and mixing rate also decline to laminar values.

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