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The Influence of Spanwise Rotation on the Redistribution of Turbulent Kinetic Energy in Fully-Developed Channel Flows CHARLES PETTY, KARUNA KOPPULA, ANDRE BENARD, Michigan State University — A recently developed universal, realizable, anisotropic prestress (URAPS-) closure for the normalized Reynolds (NR-) stress is used to predict the influence of spanwise rotation on the components of the NR-stress in fully-developed channel flows. Direct numerical simulation (DNS-) results are used to determine the relative time scales needed to solve the non-linear URAPS-equation. The new closure, which predicts the existence of a region of zero intrinsic vorticity on the high pressure side of the channel, provides an explanation of how rotation redistributes turbulent kinetic energy among the three components of the fluctuating velocity. The non-linear algebraic URAPS-equation is formulated as a mapping of the NR-stress into itself; therefore, fixed points of the URAPS-equation are *realizable* for all turbulent flows, regardless of the benchmark flows used to calibrate the model parameters. The URAPS-closure together with closed transport equations for the turbulent kinetic energy and the turbulent dissipation provide a low-order closure for the RANS-equation.

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