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Energy Transfer Mechanisms in Adverse Pressure Gradient Turbulent Boundary Layers[1] TAYGUN GUNGOR, YVAN MACIEL, Universit Laval, AYSE G. GUNGOR, Istanbul Technical University — The spectral distributions of the transport equation budgets of all Reynolds stresses in adverse gradient pressure (APG) turbulent boundary layers (TBLs) are examined to understand the energy transfer mechanisms in the inner and outer layers of APG TBLs. The spectra of the budget terms are obtained for two streamwise positions, which correspond to small and large velocity defect situations, of a non-equilibrium APG TBL using temporally collected data. The turbulence production is predominantly in the inner layer and due to small-scale structures for the small defect case, although there are energy-carrying large-scale structures in the outer layer. In the large defect situation, there is significant production in both inner and outer layers at small and large scales, respectively. Furthermore, the behavior of the pressure-strain rate and production spectra illustrates that the inter-component energy transfer from the streamwise component to the other components and production happen at similar wavelengths and wall-normal positions. More detailed results about energy transport between the inner and outer layers will be presented at the meeting.

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