

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Anisotropy-resolving models for predicting separation in 3-D asymmetric diffusers** ELBERT JEYAPPAUL, PAUL DURBIN<sup>1</sup>, Iowa State University — All linear eddy-viscosity models are qualitatively incorrect in predicting separation in 3-D asymmetric diffusers. The failure to predict normal stress and shear stress anisotropy at high production-dissipation ratios is the cause. The Explicit algebraic Reynolds stress model (Wallin and Johansson, 2000) predicts the mean flow field in the diffuser accurately, but not the wall pressure and Reynolds stresses. Recalibrating the coefficients of the rapid part of pressure-strain model improves the wall pressure prediction. Including the convective, diffusive, streamline curvature effects on anisotropy has not been beneficial. The model has been tested using a family of diffusers having the same nominal streamwise pressure gradient, LES data is used as a reference.

<sup>1</sup>Professor

Elbert Jeyapaul  
Iowa State University

Date submitted: 12 Aug 2011

Electronic form version 1.4