Abstract Submitted
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Organization of very-long coherent structures in a turbulent pipe DNS with long domain[1] RONALD ADRIAN, JON BALTZER, Arizona State University, XIAOHUA WU, Royal Military College of Canada — Regions of negative velocity fluctuation are extracted from a turbulent pipe simulation at $Re_\tau = 685$. The lengths of these regions are characterized for a range of thresholds. The organizational patterns of these structures are analyzed using a linear stochastic estimate of a negative velocity fluctuation event. Instantaneous examples of these events are compared with the patterns in the estimate to understand the relationship between structure organization and the two-point spatial correlation. Close examination of the very long motions reveal distinct forms of smaller motions with different characteristic scales. Studying these structural elements provides insight into how the smaller motions compose the very long motions. Cross-sections in various planes are compared to features observed in experimental investigations, including vortical motions. Three-dimensional vortical structures are extracted using several methods, and their geometries and relationships with the velocity motions are examined.

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