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**Pressure time correlation in turbulent shear flows** LI GUO, LNM, Institute of Mechanics, Chinese Academy of Sciences, XIN ZHANG, GUOWEI HE, LNM, Institute of Mechanics, Chinese Academy of Science — Pressure time correlations are important to turbulence-generated noise and flow-induced vibration. In this study, we numerically and theoretically investigate pressure time correlations in turbulent shear flows. We calculate the pressure time correlation from the direct numerical simulation (DNS) of turbulent channel flows. It is observed that the pressure time correlations decay faster than the streamwise velocity time correlations. This is different from isotropic homogenous turbulence, where the pressures have the same decorrelation time scales as velocities. A theoretical model is developed to confirm this observation. We further check Taylor frozen-flow model for pressure time correlation in turbulent channel flows. It is found that Taylor's model is not valid for strong shear rates. Based on this observation, we develop a non-frozen flow model, which takes the mean shear effects into account. This model is also verified using the DNS data of turbulent channel flows.

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