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Assessment of low-speed mixing and diffusion models for detonating compressible turbulence HYEJIN OH, FOLUSO LADEINDE, Stony Brook University — Several studies, for example, Ref [1], have shown that thermodynamic gradients caused by hot spots in reactive gas mixtures could lead to spontaneous initiation of detonation. These laminar-flow approach can predict the conditions for the onset of detonation in quiescent gas mixtures, and only forms detonation in localized and isolated hot spots on time scales shorter than, or comparable to, chemical and acoustic timescales. On the other hand [2], in highly turbulent autoignition flows, turbulence and compressibility together can generate non-monotonic temperature fields with tightly-spaced minima and maxima that vary over a wide range of length and time scales, including those much larger than chemical and acoustic length and time scales. Towery et al. [2] successfully pursued this possibility in their work, using DNS of compressible homogenous an isotropic turbulence. In the present work, the datasets generated in [2] are used to investigate some aspects of turbulence statistics, to understand previous mixing and diffusion models for reactive scalars, with a focus on the extension to reactive compressible turbulence. [1] Khokhlov, A., Astronomy and Astrophysics 246 pp. 211-214 (1991) [2] Towery, C. A. Z. et al., Combustion and Flame 213, pp. 172-183 (2020)

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