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**High Karlovitz *n*-Alkane Premixed Flame DNS: Effects of the Flame on Turbulence Characteristics** BROCK BOBBITT, BRUNO SAVARD, GUILLAUME BLANQUART, California Institute of Technology — The study of premixed turbulent combustion requires understanding turbulence and chemistry independently as well as their effects upon one another. This coupling alters their inherent characteristics in a complex fashion. Unfortunately, the transformation of the turbulence across the flame is not well understood and it is common to assume homogeneous, isotropic turbulence before and after the flame. To this end, direct numerical simulations were performed of homogeneous isotropic turbulence interacting with a premixed flame. These were done at a Karlovitz number of approximately 100 using both tabulated and detailed $n$-heptane air chemistry. The integral length scale was four times the laminar flame thickness allowing study of both large and small scale turbulence. The transformation of these turbulent scales across the flame was investigated throughout and behind the flame. A model for the transfer function was developed by applying a generalized expansion to the continuity, momentum, vorticity, temperature, and species transport equations. From this, equations are derived which describe to leading order the transformation of turbulent velocity and length scales across the flame.

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