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In-Situ Analysis of Gradient Trajectories in a Reactive Turbulent Shear Flow FELIX DIETZSCH, MICHAEL GAUDING, CHRISTIAN HASSE, TU Bergakademie Freiberg — Most understanding of turbulent fine-scale mixing has been gained from conditional statistics. Conditional statistics are examined along gradient trajectories, which constitute a natural, intrinsic coordinate system of the underlying scalar field. Statistics along gradient trajectories contain information about the temporal mechanism of turbulent mixing and combustion. Analyzing these statistics is an important step to understand the transient behaviour of the interaction between turbulence and chemistry. The tracking of gradient trajectories is very challenging and has to be conducted in-situ in order to capture the smallest time-scales. The analysis is based on a direct numerical simulation of a turbulent diffusion flame exhibiting extinction and reignition.

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