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Adam Larios^{*} (alarios^Qunl.edu), Mohammad Mahabubur Rahmang and Kazuo Yamazaki. Fanning the flames: Unreasonable modifications to the flame equations.

The Kuramoto-Sivashinsky equation (KSE) is a beautiful and highly chaotic dynamical system that arises in flame fronts, plasmas, crystal growth, and many other phenomena. Due to its lack of a maximum principle and its advective-type nonlinearity, the KSE is often studied as an analogue to the 3D Navier-Stokes equations (NSE). Much progress has been made on the 1D KSE since roughly 1984, but even for the 2D KSE, global well-posedness remains a major open question. Moreover, as has been demonstrated recently by Kostianko, Titi, and Zelik, standard regularizations that work well for Navier-Stokes fail when applied to even the 1D KSE. Despite this, we present linear modifications of the 2D KSE which allow for global well-posedness, while still retaining many horrifying features of the 2D KSE. We will also discuss some recent results on Prodi-Serrin type results for the 2D KSE. This talk will describe key ideas of the analysis, and show many colorful movies of solutions. (Received August 10, 2021)