Optimal Stretching for Advection-Reaction-Diffusion in a Bluff Body Wake JINGE WANG, JEFFREY TITHOF, THOMAS NEVINS, RONY COLON, DOUGLAS KELLEY, Univ of Rochester — We study front growth of the excitable Belousov-Zhabotinsky (BZ) reaction in the wake region behind a triangular bluff body in a water channel. We analyze the reaction propagation based on a recent paper[1] that correlates reaction state with Lagrangian stretching. We measure the probability of a region being reacted, conditioned on the local stretching, and show that an optimal range of stretching enhances reaction propagation. The optimal range we measure is similar to the range found previously in a very different flow[1], an array of vortices. We hypothesize that an optimal stretching range exists in many advection-reaction-diffusion systems with excitable chemistry, and that its numerical value is largely dependent on the chemistry rather than advection variety. Our experiments may also give insight into the dynamics of plankton blooms behind islands in ocean currents.

[1]T. D. Nevins and D. H. Kelley, Phys. Rev. Lett. **117**, 164502 (2016).

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