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Detonation attenuation by a porous medium and its subsequent re-initiation BRIAN MAXWELL, MATEI RADULESCU, University of Ottawa — The detonation attenuation by a series of cross-flow cylinders, and its subsequent re-initiation mechanisms are studied experimentally and numerically, for a one-step chemically reacting fluid. A decrease in the scale of the blocking cylinders, or an increase in the number of the cylinders, is seen to delay the re-establishment of a self-sustained detonation. A detailed reconstruction of the detonation reflection and diffraction around the obstacles will be given, along with the complex flow fields involving wave reflections at the exit of the porous medium. The re-initiation mechanism is observed to be a function of not only the strength of wave reflections, but also the strength of the expansion wave following the reactive front, which affects the chemical kinetic rates behind the shock. A global model is proposed, which takes into account the momentum losses in terms of the flow blockage by the porous medium.

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