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Numerical modeling of shock-to-detonation transition
in methane–air mixture in a tube with central body

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To realize fast DDT in a high-intensity PDE pulse detonation burner or PDE operating on methane–air mixture, it has been suggested to insert a properly shaped central body into a detonation tube. For optimizing the shape of the axisymmetric central body aimed at minimizing the DDT run-up distance and time, a systematic 2D numerical simulation of shock-to-detonation transition in the inviscid reactive flow was performed. As a result of the study, the optimal geometrical parameters of the central body were obtained for further experiments.