

# Technical Program and Abstracts



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## Experimental study of shock-to-detonation transition in natural gas – air mixture

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It has been shown experimentally for the first time that the insert of an axisymmetric convergent–divergent (CD) nozzle of special shape into a 94-millimeter diameter detonation tube allows shock-to-detonation transition in a stoichiometric natural gas (98.6% methane) – air mixture at standard temperature and pressure when the incident shock wave propagates at Mach number exceeding 3.3. In the experiments, the incident shock wave was generated by burning the stoichiometric natural gas – air mixture at elevated pressure in a high-pressure chamber 1 m long separated by a bursting diaphragm from the low-pressure chamber 3.5 m long. The CD nozzle was installed at a distance of 1.6 m from the bursting diaphragm. The results of experiments are important for better understanding the dynamics of accidental explosions of methane in coal mine galleries and for the development of high-intensity pulsed detonation burners operating on natural gas.