

# ICPCD 12

12th International  
Colloquium  
on Pulsed  
and Continuous  
Detonations

**TECHNICAL PROGRAM**

## Monday, October 19, 2020

**9:50–10:20**

**Registration**

**10:20–10:30**

**Opening Ceremony (*S. M. Frolov*)**

**Session 1: Fundamentals of deflagrations and detonations-I**

**Session Chair: *V. Vlasenko***

**10:30–11:30 Keynote Lecture:**

Pulse-detonation steam superheater

*S. M. Frolov, V. A. Smetanyuk, I. O. Shamshin, F. S. Frolov,  
and S. A. Nabatnikov*

**11:30–12:00**

**Coffee break**

**12:00–12:30**

Features of autoignition of methane–hydrogen mixtures

*A. V. Arutyunov, A. A. Belyaev, K. Ya. Troshin, A. V. Nikitin,  
and V. S. Arutyunov*

**12:30–13:00**

Mathematical modeling of supersonic mixing and combustion  
in near-wall region

*R. S. Solomatin and I. V. Semenov*

**13:00–14:00**

**Lunch**

## **Session 2: Fundamentals of deflagrations and detonations-II**

**Session Chair: *V. Smetanyuk***

**14:00–14:30**

Detonation propagation in periodic nonuniform media: Resonance and mode locking phenomena

*A. Kasimov and A. Goldin*

**14:30–15:00**

Pressure measurement in rotating detonation engines

*V. S. Ivanov, S. S. Sergeev, S. M. Frolov, Yu. M. Mironov, A. E. Novikov, and I. I. Schulz*

**15:00–15:30**

Numerical study of detonation propagation in viscous turbulent flow in a duct

*V. A. Sabelnikov, V. V. Vlasenko, S. Bakhne, S. S. Molev, and A. I. Troshin*

**15:30–16:00**

**Coffee break**

**16:00–16:30**

The supersonic argon flow parameters in an arcjet thruster

*V. I. Gorbunkov, V. V. Shalai, and N. V. Pustovoi*

**16:30–17:00**

Detonation structures in a supersonic annular ramjet chamber

*A. V. Trotsyuk*

**18:00–20:00**

**Welcome Party**

**Tuesday, October 20, 2020**

**Session 3: Fundamentals of deflagrations and detonations-III**

**Session Chair: *F. Bykovskii***

**10:00–11:00 Keynote Lecture:**

Ranking of fuel–air mixtures in terms of their propensity to deflagration-to-detonation transition

*S. M. Frolov, V. I. Zvegintsev, V. S. Aksenov, I. V. Bilera, M. V. Kazachenko, I. O. Shamshin, P. A. Gusev, and M. S. Belotserkovskaya*

**11:00–11:30**

Burning of a mixture of liquid kerosene and cold air in a detonation chamber 503 mm in diameter with chamber geometry variation

*F. A. Bykovskii, S. A. Zhdan, and E. F. Vedernikov*

**11:30–12:00**

**Coffee break**

**12:00–12:30**

Pulsed combustion of the fuel–air mixture in the cavity under the boat bottom: Simulation and outdoor tests

*S. M. Frolov, S. V. Platonov, K. A. Avdeev, V. S. Aksenov, V. S. Ivanov, A. E. Zangiev, I. A. Sadykov, R. R. Tukhvatullina, F. S. Frolov, and I. O. Shamshin*

**12:30–13:00**

Propagation of gaseous detonations in planar curved rectangular channels

*M. L. Fotia, C. A. Stevens, J. Hoke, and S. A. Schumaker*

**13:00–14:00**

**Lunch**

## **Session 4: Continuous and Pulsed Detonation Engines**

**Session Chair: *I. Shamshin***

### **14:00–15:00 Keynote Lecture:**

Multidimensional simulations and test fires of a hydrogen-fueled ramjet with an annular detonative combustor at approaching air flow of Mach 2 and 1.5

*V. S. Ivanov, V. S. Aksenov, P. A. Gusev, S. M. Frolov, I. O. Shamshin, and A. E. Zangiev*

### **15:00–15:30**

Two engineering solutions for the development of pulsed detonation engine design

*K. V. Migalin and K. A. Sidenko*

### **15:30–16:00**

**Coffee break**

### **16:00–16:30**

Detonation of low-density emulsion explosive

*S. A. Gorinov and I. Yu. Maslov*

### **16:30–17:00**

Modeling of initiation of gas detonation in a plan radial chamber

*D. V. Voronin*

## Wednesday, October 21, 2020

### **10:00–14:00**

Bus tour “Masonic St. Petersburg” with a visit to the Rotunda  
(beginning — Residence Dashkova Hotel,  
ending — PetroPalas Hotel)

### **14:00–15:00**

Lunch at PetroPalas Hotel

### **15:00–16:00**

Walking tour “Pushkin St. Petersburg” from the PetroPalas hotel  
with a visit of the Church of the Savior Nerukotvorny Image

### **16:00–17:00**

River and canal boating (from the Pevchesky Bridge)

**Thursday, October 22, 2020**

**Session 5: TELECONFERENCE**

**Session Chair:** *S. Frolov*

**10:00–11:00 Keynote Lecture:**

An oasis of pure aerothermal dilemmas: Integrating turbines with RDC  
*G. Paniagua, J. Braun, T. Meyer, V. Athmanathan, and S. Roy*

**11:00–11:30**

Research and development of detonation engine system for the sounding rocket flight experiment S-520-31

*J. Kasahara, K. Goto, R. Yokoo, B. Valentin, A. Kawasaki, K. Matsuoka, and K. Matsuyama*

**11:30–12:00**

**Coffee break**

**12:00–12:30**

The effect of an initial sinusoidal density perturbation on the nonlinear dynamics of one-dimensional unsteady gaseous detonations

*Mira Kim, Xiaocheng Mi, C. B. Kiyanda, Honghui Teng, and Hoi Dick Ng*

**12:30–13:00**

Experimental investigation of the unsteady wall heat flux generated by the propagation of a self-sustained detonation

*H. Quintens, Q. Michalski, F. Virost, and M. Bellenoue*

**13:00–14:00**

**Lunch**

**14:00–14:30**

Numerical simulation of the compaction effect during the shock wave – particles layer interaction

*Ya. E. Poroshyna and P. S. Utkin*

**14:30–15:00**

Two-dimensional numerical simulation of the shock wave – particles layer interaction using Cartesian grid method

*D. A. Sidorenko and P. S. Utkin*

**15:00–15:30**

Propagation of the burning wave in a pulse detonation combustor operating on mixtures of heptane and Jet A-1 with air and oxygen at  $[O_2/air] < 1$

*M. S. Assad, O. G. Penyazkov, I. I. Chernuho, and K. Alhussan*

**15:30–16:00****Coffee break****16:00–16:30**

High-response complex for analyzing droplets and vapors in aerosol clouds formed in the atmosphere due to liquid dispersion

*A. V. Zagnitko, N. P. Zaretskii, I. D. Matsukov, V. V. Pimenov, and S. E. Salnikov*

**16:30–17:00**

Contribution of “oxidizer–fuel” reaction to the detonation parameters and propelling action of explosion

*A. S. Smirnov, I. A. Kuznetsov, O. A. Ukhabin, A. S. Orlov, A. V. Morozov, A. A. Merkin, and V.G. Kozhevnikov*

**17:00–17:30**

Detonation initiation in combustible gas mixture upon interaction of a shock wave with an inert gas bubble

*P. Yu. Georgievskiy, V. A. Levin, and O. G. Sutyurin*

**19:00–22:00****Conference Dinner**



**October 19–22, 2020, St. Petersburg, Russia**

