XXXI International Conference on Equations of State for Matter

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Abstract. This paper is a preface to the proceedings of the XXXI International Conference on Equations of State for Matter, which was held in Elbrus settlement, in the Kabardino-Balkar Republic of the Russian Federation, during March 1–6, 2016. The conference was devoted to the seventieth anniversary of birth of Aleksey Vladimirovich Bushman (16.10.1946–6.12.1993), the author of classic works on equations of state for matter over a wide range of thermodynamic parameters on phase diagram.

1. Introduction

The XXXI International Conference on Equations of State for Matter (ELBRUS 2016) was held at the Educational-Scientific Base of the Kabardino-Balkarian State University in Elbrus settlement, in the Kabardino-Balkar Republic of the Russian Federation, from Tuesday, March 1, to Sunday, March 6, 2016 (\texttt{http://www.ihed.ras.ru/elbrus16}).

This thirty-first meeting continued a regular series of conferences on physics at high energy densities, which began at the I National Session on Equations of State for Matter held in Cheget (in the vicinity of Mount Elbrus, Russia) in 1978. In 2016, the conference was devoted to the seventieth anniversary of birth of Aleksey Vladimirovich Bushman (16.10.1946–6.12.1993), the author of classic works on equations of state for matter over a wide range of thermodynamic parameters on phase diagram (figure 1).

2. Conference location

Elbrus settlement is 18 km from Mount Elbrus (the highest pike of the Caucasus at 5642 m), 120 km from Nalchik, which is the capital of the Kabardino-Balkar Republic, and 200 km from Mineralnye Vody, where the nearest international airport is located. Elbrus settlement is situated in the valley of the Baksan River, which begins on Mount Elbrus. All settlements in the valley (Itkol, Cheget and Terskol) are famous ski resorts at altitude of approximately 2000 m. This valley is in a National Park, which is a region of extreme natural beauty (figure 2). Visit to Mount Elbrus is possible by cable car for seeing the Greater Caucasus range with permanent snow from the Old Krugozor (3000 m), Mir (3500 m) and Gara-Bashi (3850 m) stations.
3. Founders
- Joint Institute for High Temperatures RAS, Moscow, Russia;
- Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia;
- Kabardino-Balkarian State University, Nalchik, Russia.

4. Sponsors
- Russian Academy of Sciences;
- Russian Foundation for Basic Research.

5. Organization
5.1. Chairs
- Vladimir E Fortov (Joint Institute for High Temperatures RAS, Moscow, Russia);
- Barasbi S Karamurzov (Kabardino-Balkarian State University, Nalchik, Russia).

5.2. Vice-chair
- Vladimir P Efremov (Joint Institute for High Temperatures RAS, Moscow, Russia).

5.3. Secretaries
- Konstantin V Khishchenko (Joint Institute for High Temperatures RAS, Moscow, Russia);
Figure 2. The valley of the Adylsu River.

- Valery G Sultanov (Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia).

5.4. Organizing committee
- Evgeny N Avrorin (Russian Federal Nuclear Center—Zababakhin All-Russian Institute of Technical Physics, Snezhinsk, Russia);
- Anatoly A Akhkubekov (Kabardino-Balkarian State University, Nalchik, Russia);
- Alexander A Golubev (State Scientific Center of the Russian Federation “Institute for Theoretical and Experimental Physics”, National Research Center “Kurchatov Institute”, Moscow, Russia);
- Gennady I Kanel (Joint Institute for High Temperatures RAS, Moscow, Russia);
- Pavel R Levashov (Joint Institute for High Temperatures RAS, Moscow, Russia);
- Victor B Mintsev (Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia);
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• Boris Yu Sharkov (Facility for Antiproton and Ion Research, Darmstadt, Germany);
• Mikhail V Zhernokletov (Russian Federal Nuclear Center—All-Russian Institute of Experimental Physics, Sarov, Russia);
• Leonid V Zhigilei (University of Virginia, Charlottesville, VA, USA);
• Marvin A Zocher (Los Alamos National Laboratory, Los Alamos, NM, USA).

5.5. Website coordinator
• Maxim A Kadatskiy (Joint Institute for High Temperatures RAS, Moscow, Russia).

5.6. Program committee
• Konstantin V Khishchenko (Joint Institute for High Temperatures RAS, Moscow, Russia);
• Galina V Shpatakovskaya (Keldysh Institute of Applied Mathematics RAS, Moscow, Russia);
• Gennady I Kanel (Joint Institute for High Temperatures RAS, Moscow, Russia);
• Denis V Shakhray (Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia);
• Vladimir P Efremov (Joint Institute for High Temperatures RAS, Moscow, Russia);
• Victor B Mintsev (Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia);
• Nikolay E Andreev (Joint Institute for High Temperatures RAS, Moscow, Russia);
• Igor L Iosilevskiy (Joint Institute for High Temperatures RAS, Moscow, Russia);
• Lev G D’yachkov (Joint Institute for High Temperatures RAS, Moscow, Russia).

5.7. Organizers
• Elena S Khromova (Research Consulting Center “FORUM-SM”, Chernogolovka, Russia);
• Galina Yu Vorob’eva (Research Consulting Center “FORUM-SM”, Chernogolovka, Russia).

6. Topics
• Equations of state and constitutive equations for matter under extreme conditions at high pressures and temperatures;
• Shock waves, detonation and combustion physics;
• Interaction of intense laser, x-ray and microwave radiation with matter;
• Interaction of powerful particle beams with matter;
• Techniques of intense energy fluxes generation;
• Diagnostics of ultrafast processes;
• Low-temperature plasma physics;
• Issues of physics and power engineering, technology aspects.

7. Participants
397 people were pre-registered as participants of the conference. They submitted 348 abstracts with results of works of 750 co-authors from 108 institutions from 11 countries (Algeria, Belarus, France, Germany, Israel, Japan, Kazakhstan, Russia, Saudi Arabia, Turkey and USA).
237 participants attended the sessions from different cities of Russia, Belarus, Germany, Turkey, Saudi Arabia and Israel (figure 3).

8. Scientific program
The conference program consisted of 1 plenary, 89 regular oral and 258 poster presentations.
8.1. Plenary
At the first day of conference sessions, academician Fortov gave a plenary talk on mechanical measurements in high-energy-density physics.

8.2. Oral sessions
There were 75 regular talks presented during 4 consecutive sessions:

- Equations of state for matter;
- Shock waves, detonation and combustion;
- Power interaction with matter;
- Physics of low temperature plasma.

At the opening of the first session, professor Lomonosov gave a talk on A V Bushman (figure 4) and equation-of-state problem.

8.3. Poster session
All posters were presented during a common poster session on March 3, 2016.

9. Best young work prize
Among young participants, traditionally, a competition for the best work prize was carried out. Prizes went to
Figure 4. A V Bushman (on the right-hand side) discusses details of shock-wave experiments with V Ya Ternovoi at the Branch of the Institute of Chemical Physics of the Academy of Sciences USSR, Chernogolovka, in the eighties of the XX century.

- Olga N Rosmej (GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany)—“Laser energy conversion efficiency to hot electrons in the interaction with metal targets”;
- Yelena A Galitskaya (Institute of Solid State Physics RAS, Chernogolovka, Russia)—“The hydrogen solubility in silicates at high pressure”;
- Kseniya A Talala (Academician Makeyev State Rocket Centre, Miass, Russia)—“Diffusion mass transfer in multicomponent multilayered metallic samples irradiated by high-current electron beams”;
10. Prospects
The next meeting of the series will be the XXXII International Conference on Interaction of Intense Energy Fluxes with Matter, which is planned in vicinity of Mount Elbrus during March 1–6, 2017. That will be announced via the website http://www.ihed.ras.ru/elbrus17.

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