XXXIII International Conference on Equations of State for Matter

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Abstract. This paper is a preface to the proceedings of the XXXIII International Conference on Equations of State for Matter, which was held in Elbrus and Tegenekli, in the Kabardino-Balkar Republic of the Russian Federation, from March 1 to 6, 2018.

1. Introduction
The XXXIII International Conference on Equations of State for Matter (ELBRUS 2018) was held at the Educational-Scientific Base of the Kabardino-Balkarian State University in the village of Elbrus and the Elbrus pension in the village of Tegenekli, in the Kabardino-Balkar Republic of the Russian Federation, from Thursday, March 1, to Tuesday, March 6, 2018 [1].

This conference is devoted to the 40th anniversary of the I All-Union Session on Equations of State for Matter held in Elbrus and Tegenekli, in the Kabardino-Balkar Republic of the Russian Federation, from March 1 to 6, 2018.

2. Conference location
Elbrus and Tegenekli are 18 km from Mount Elbrus (the highest pike of the Caucasus at 5642 m), about 115 km (Tegenekli is 1.6 km further than Elbrus) from Nalchik, which is the capital of the Kabardino-Balkar Republic, and about 170 km from Mineralye Vody, where the nearest international airport is located. The both villages are situated in the valley of the Baksan River, which begins on Mount Elbrus. Other villages 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 1). 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 (3780 m) stations.

3. Founders
- Joint Institute for High Temperatures (JIHT) RAS, Moscow, Russia;
- Institute of Problems of Chemical Physics (IPCP) RAS, Chernogolovka, Russia;
- Kabardino-Balkarian State University (KBSU), Nalchik, Russia.
Figure 1. The valley of the Baksan River.

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

5. Organization
5.1. Chairmen
- Vladimir E Fortov (JIHT RAS, Moscow, Russia);
- Barasbi S Karamurzov (KBSU, Nalchik, Russia).

5.2. Co-Chairman
- Vladimir P Efremov (JIHT RAS, Moscow, Russia).

5.3. Vice-Chairmen
- Konstantin V Khishchenko (JIHT RAS, Moscow, Russia);
- Valery G Sultanov (IPCP RAS, Chernogolovka, Russia).

5.4. Organizing committee
- Evgeny N Avrorin¹ (Russian Federal Nuclear Center—Zababakhin All-Russian Institute of Technical Physics, Snezhinsk, Russia);
- Anatoly A Akhkubekov (KBSU, Nalchik, Russia);

¹ 11 July 1932 to 9 January 2018.
• Alexander Alex Golubev (State Scientific Center of the Russian Federation “Institute for Theoretical and Experimental Physics”, National Research Center “Kurchatov Institute”);
• Gennady I Kanel (JIHT RAS, Moscow, Russia);
• Pavel R Levashov (JIHT RAS, Moscow, Russia);
• Victor B Mintsev (IPCP RAS, Chernogolovka, Russia);
• Anatoly L Mikhailov (Russian Federal Nuclear Center—All-Russian Institute of Experimental Physics, Sarov, Russia);
• Vladimir V Molkov (University of Ulster, Northern Ireland, UK);
• Adam M Nakhushev (Institute of Applied Mathematics and Automation, Nalchik, Russia);
• Dmitriy V Petrov (Russian Federal Nuclear Center—Zababakhin All-Russian Institute of Technical Physics, Snezhinsk, Russia);
• Oleg F Petrov (JIHT RAS, Moscow, Russia);
• Gerd Röpke (University of Rostock, Rostock, Germany);
• Aleksey P Savintsev (KBSU, Nalchik, Russia);
• Vadim A Simonenko (Russian Federal Nuclear Center—Zababakhin All-Russian Institute of Technical Physics, Snezhinsk, Russia);
• Boris Yu Sharkov (Facility for Antiproton and Ion Research, Darmstadt, Germany);
• Eduard E Son (JIHT RAS, Moscow, Russia);
• 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 (JIHT RAS, Moscow, Russia).

5.6. **Program committee**

• Konstantin V Khishchenko (JIHT RAS, Moscow, Russia);
• Maxim A Kadatskiy (JIHT RAS, Moscow, Russia);
• Galina Shpatakovskaya (Keldysh Institute of Applied Mathematics RAS, Moscow, Russia);
• Pavel R Levashov (JIHT RAS, Moscow, Russia);
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• Victor B Mintsev (IPCP RAS, Chernogolovka, Russia);
• Nikolay E Andreev (JIHT RAS, Moscow, Russia);
• Eduard E Son (JIHT RAS, Moscow, Russia);
• Igor L Iosilevskiy (JIHT RAS, Moscow, Russia);
• Lev G D’yachkov (JIHT 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
465 people were pre-registered as participants of the conference. They submitted 401 abstracts [2] with results of works of 911 co-authors from 134 institutions from 15 countries (Argentina, Belarus, China, France, Germany, India, Israel, Italy, Japan, Kazakhstan, Russia, Saudi Arabia, Turkey, the United Kingdom, the United States of America).

232 participants attended the sessions from different cities of China, Germany, Israel, Russia and the United States of America (figure 2).

8. Scientific program
The conference program consisted of 4 plenary, 72 regular oral and 325 poster presentations.

8.1. Plenary
During the first three days of the conference sessions, the plenary talks were given by four invited speakers:

- Vladimir E Fortov (JIHT RAS, Moscow, Russia)—“Is there chemistry at megabars?”;
- Igor L Iosilevskiy (JIHT RAS, Moscow, Russia)—“Anomalous thermodynamics and entropic fluid–fluid phase transition problem in highly compressed hydrogen and nitrogen”;
• Dieter H H Hoffmann (Xi’an Jiaotong University, Xi’an, China)—“Accelerator driven high energy density science: Status of high-energy-density physics at FAIR and GSI”;
• Dmitry V Petrov (Russian Federal Nuclear Center—Zababakhin All-Russian Institute of Technical Physics, Snezhinsk, Russia)—“Investigation into shock compression of the materials”.

8.2. Oral sessions
There were 55 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.

8.3. Poster session
All posters were presented during two poster sessions on March 2 and 3, 2018.

9. Best young work prize
Among young participants, traditionally, a competition for the best work prize was carried out. Prizes went to
• Svetlana V Savushkina (The State Scientific Centre of the Russian Federation Federal State Unitary Enterprise Keldysh Research Center, Moscow, Russia)—“Investigation of zirconia plasma electrolytic oxidation coatings by nuclear backscattering spectrometry”;
• Kseniya S Melnikova (JIHT RAS, Moscow, Russia)—“On the structure and stability of ultra-lean flames”;
• Anastasia I Krikunova (JIHT RAS, Moscow, Russia)—“Experimental study of coupled acoustic and electric discharge effect on methane–air flame”;
• Evgeniya V Vilshanskaya (JIHT RAS, Moscow, Russia)—“The vacuum system in experimental setup for laser cooling of calcium atoms”.

10. Prospects
The following meeting of the series will be the XXXIV International Conference on Interaction of Intense Energy Fluxes with Matter, which is planned in Cheget from March 1 to 6, 2019.

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Konyukhov, O N Koroleva, X G Koss, A V Kostanovskiy, V S Krasnikov, I K Krasyuk, A I Krikunova, S I Krivosheev, P R Levashov, E A Lisin, I R Makeyeva, A E Mayer, S P Medvedev, V B Mintsev, I V Morozov, A V Oginov, V I Oreshkin, V A Petrov, Yu V Petrov, S A Pikuz, M E Pinchuk, V O Podryga, M E Povarnitsyn, A D Rakhel, A A Rykunov, V N Senchenko, D V Shakhray, V V Shumova, D S Sitnikov, S I Tkachenko, V M Torchinsky, A V Utkin, L M Vasilyak, M E Veysman, V S Vorobiev, B B Zelener, V V Zhakhovskiy, and P V Zinin for the papers reviewing.

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[3] URL http://www.ihed.ras.ru/elbrus19