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INTERNATIONAL CONFERENCE ON EQUATIONS OF STATE FOR MATTER

MARCH 1-6 2020
ELBRUS
KABARDINO-BALKARIA
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BOOK OF ABSTRACTS

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The book consists of abstracts of plenary lectures, oral reports and posters presented at the XXXV International Conference on Equations of State for Matter (1–6 March 2020, Elbrus, Kabardino-Balkaria, Russia). The presentations deal with the contemporary investigations in the field of physics of extreme states of matter. The conference topics are as follows: 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, powerful particle beams with matter; experimental techniques of generation and diagnostics of extreme states of matter; methods of mathematical modeling in physics of extreme states of matter; high-energy astrophysics; physics of low-temperature and non-ideal plasma; physical issues of power engineering and technology aspects.

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The editorial board with deep regret announces the death of friends and colleagues: Professor Vladimir Ivanovich Molotkov (17 March 1941 – 11 July 2019); Corresponding Member of the Russian Academy of Sciences, Professor Sergey Ivanovich Anisimov (11 December 1934 – 15 October 2019); Doctor Vyacheslav Aleksandrovich Petukhov (6 February 1940 – 26 November 2019); Professor Alexander Borisovich Shvartsburg (26 January 1937 – 15 February 2020). All of them were active participants in the Conferences on Equations of State for Matter and Interaction of Intense Energy Fluxes with Matter.

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Microscopic structure and three-particle correlations in liquid and amorphous aluminum

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Three-particle correlations have a significant effect on various processes occurring in a condensed substance, for example, transport properties in chemical reactions, and amorphization of liquids upon rapid cooling. Experimental methods does not allow to estimate directly of three-particle correlations, whereas detailed information about three-particle correlations can be obtained by molecular dynamics simulation methods.

In this work, we study three-particle correlations in liquid and amorphous Al on the basis of molecular dynamics simulation data. The three-particle correlation function $g(S)$ was introduced to characterize the relative positions of various three atoms (so-called triplets with area S). It was found that in liquid aluminum with the temperatures 1000, 1500 and 2000 K, the three-particle correlations are more pronounced in spatial scales comparable with the size of the second coordination sphere. In the case of amorphous aluminum with the temperatures 50, 100 and 150 K, correlations in the mutual arrangement of the three particles are manifested up to spatial scales that are comparable with the size of the third coordination sphere.

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