

Результаты научно-исследовательской деятельности
кафедры общей и прикладной физики (аспирантура 03.06.01 – физика и
астрономия)

Список основных публикаций сотрудников кафедры общей и прикладной физики за 2011-2015 годы

1. Borodin E.N., Mayer A.E. Structural model of mechanical twinning and its application for modeling of the severe plastic deformation of copper rods in Taylor impact tests // International Journal of Plasticity. – 2015. – V. 74. – P. 141-157. (<http://dx.doi.org/10.1016/j.ijplas.2015.06.006>) [impact-factor JCR 5.567]
2. Krasnikov V.S., Mayer A.E. Plasticity driven growth of nanovoids and strength of aluminum at high rate tension: Molecular dynamics simulations and continuum modeling // International Journal of Plasticity. – 2015. – V. 74. – P. 75-91. (<http://dx.doi.org/10.1016/j.ijplas.2015.06.007>) [impact-factor JCR 5.567]
3. Pogorelko V.V., Mayer A.E. Influence of copper inclusions on the strength of aluminum matrix at high-rate tension // Materials Science and Engineering: A. – 2015. – 642. – P. 351-359. (<http://dx.doi.org/10.1016/j.msea.2015.07.009>) [impact-factor JCR 2.567]
4. Bratov V.A., Borodin E.N. Comparison of dislocation density based approaches for prediction of defect structure evolution in aluminium and copper processed by ECAP // Materials Science and Engineering: A. – 2015. – 639. – P. 10-17. (<http://dx.doi.org/10.1016/j.msea.2015.02.019>) [impact-factor JCR 2.567]
5. Mayer A.E., Mayer P.N. Continuum model of tensile fracture of metal melts and its application to a problem of high-current electron irradiation of metals // Journal of Applied Physics. – 2015. – V. 118 (3) – P. 035903. (<http://dx.doi.org/10.1063/1.4926861>) [impact-factor JCR 2.183]
6. Mayer A.E., Mayer P.N. Strength of solid and molten aluminum under dynamic tension // JETP Letters. – 2015. – Vol. 102. – No. 2. – C. 80-84. (<http://dx.doi.org/10.1134/S0021364015140088>) [impact-factor JCR 1.359]
7. Mayer P.N., Mayer A.E. A model of fracture of metal melts and the strength of melts under dynamic conditions // Journal of Experimental and Theoretical Physics. – 2015. – V. 121. – No. 1. – P. 35-47. (<http://dx.doi.org/10.1134/S1063776115060096>) [impact-factor JCR 0.879]
8. Petrov Yu.V., Borodin E. N. Relaxation mechanism of plastic deformation and its justification using the example of the sharp yield point phenomenon in whiskers // Physics of the Solid State. – 2015. – V. 57. – No. 2. – P. 353-359. (<http://dx.doi.org/10.1134/S1063783415020286>) [impact-factor JCR 0.821]

9. Yanilkin A.V., Krasnikov V.S., Kuksin A.Yu., Mayer A.E. Dynamics and kinetics of dislocations in Al and Al–Cu alloy under dynamic loading // *International Journal of Plasticity*. – 2014. – V. 55. – P.94-107. (<http://dx.doi.org/10.1016/j.ijplas.2013.09.008>) [impact-factor JCR 5.567]
10. Krasnikov V.S., Mayer A.E. Modeling of plastic localization in aluminum and Al–Cu alloys under shock loading // *Materials Science and Engineering: A*. – 2014. – 619. – P. 354-363. (<http://dx.doi.org/10.1016/j.msea.2014.09.105>) [impact-factor JCR 2.567]
11. Borodin E.N., Mayer A.E., Petrov Yu.V., Gruzdkov A.A. Maximum yield strength under quasi-static and high-rate plastic deformation of metals // *Physics of Solid State*. – 2014. – V. 56. – No. 12. – P. 2470-2479. (<http://dx.doi.org/10.1134/S1063783414120051>) [impact-factor JCR 0.821]
12. Borodin E.N., Atroshenko S.A., Mayer A.E. Distribution of dislocations and twins in copper and 18Cr–10Ni–Ti steel under shock-wave loading // *Technical Physics*. – 2014. – V. 59. – No. 8. – P. 1163-1170. (<http://dx.doi.org/10.1134/S1063784214080076>) [impact-factor JCR 0.524]
13. Mayer A.E. Dynamic shear and tensile strength of iron: continual and atomic simulation // *Mechanics of Solids*. – 2014. – V. 49. – No. 6. – P. 649-656. (<http://dx.doi.org/10.3103/S0025654414060065>) [impact-factor JCR 0.213]
14. Mayer A.E., Borodin E.N. Mayer P.N. Localization of plastic flow at high-rate simple shear // *International Journal of Plasticity*. – 2013. – V. 51. – P. 188-199. (<http://dx.doi.org/10.1016/j.ijplas.2013.05.005>) [impact-factor JCR 5.567]
15. Mayer A.E., Khishchenko K.V., Levashov P.R., Mayer P.N. Modeling of plasticity and fracture of metals at shock loading // *Journal of Applied Physics*. – 2013. – V. 113 (19) – P. 193508. (<http://dx.doi.org/10.1063/1.4805713>) [impact-factor JCR 2.183]
16. Borodin E.N., Mayer A.E. Localization of plastic flow at dynamic cannel angular pressing // *Technical Physics*. – 2013. – V. 58. – No. 8. – P. 1159-1163. (<http://dx.doi.org/10.1134/S1063784213080070>) [impact-factor JCR 0.524]
17. Dudarev E. F., Markov A. B., Mayer A. E., Bakach G. P., Tabachenko A. N., Kashin O. A., Pochivalova G. P., Skosyrskii A. B., Kitsanov S. A., Zhorovkov M. F., Yakovlev E. V. Spall fracture patterns for the heterophase Cu–Al–Ni alloy in ultrafine- and coarse-grained states exposed to a nanosecond relativistic high-current electron beam // *Russian Physics Journal* - 2013. – V. 55. – No. 12. – P. 1451-1457. (<http://dx.doi.org/10.1007/s11182-013-9979-6>) [impact-factor JCR 0.671]
18. Borodin E.N., Mayer A.E. A simple mechanical model for grain boundary sliding in nanocrystalline metals // *Materials Science and Engineering: A*. – 2012. – V. 532. – P. 245-248. (<http://dx.doi.org/10.1016/j.msea.2011.10.086>) [impact-factor JCR 2.567]
19. Krasnikov V.S., Mayer A.E. Numerical investigation of the change of dislocation density and microhardness in surface layer of iron targets under the high power ion- and electron-

- beam treatment // *Surface and Coatings Technology*. – 2012. – V. 212. – P. 79-87.
(<http://dx.doi.org/10.1016/j.surfcoat.2012.09.025>) [impact-factor JCR 1.998]
20. Borodin E.N., Mayer A.E. Yield strength of nanocrystalline materials under high-rate plastic deformation // *Physics of the Solid State*. – 2012. – V. 54. – No. 4. – P.808-815.
(<http://dx.doi.org/10.1134/S1063783412040038>) [impact-factor JCR 0.821]
 21. Mayer P.N., Mayer A.E. Droplet size distribution in a metal evaporated by high-current electron beam // *Technical Physics Letters*. – 2012. – V. 38. – No. 6. – P. 559-561.
(<http://dx.doi.org/10.1134/S1063785012060259>) [impact-factor JCR 0.574]
 22. Krasnikov V.S., Mayer A.E., Yalovets A.P. Dislocation based high-rate plasticity model and its application to plate-impact and ultra short electron irradiation simulations // *International Journal of Plasticity*. – 2011. – V. 27. Iss. 8. – P. 1294-1308.
(<http://dx.doi.org/10.1016/j.ijplas.2011.02.008>) [impact-factor JCR 5.567]
 23. Borodin E.N., Mayer A.E., Krasnikov V.S. Wave attenuation in microcrystal copper at irradiation by a powerful electron beam // *Current Applied Physics*. – 2011. – V. 11. – Iss. 6. – P. 1315-1318. (<http://dx.doi.org/10.1016/j.cap.2011.03.062>) [impact-factor JCR 2.212]
 24. Mayer A.E., Krasnikov V.S. Copper spall fracture under sub-nanosecond electron irradiation // *Engineering Fracture Mechanics*. – 2011. – V. 78. – Iss. 6. – P. 1306-1316.
(<http://dx.doi.org/10.1016/j.engfracmech.2011.02.012>) [impact-factor JCR 1.767]
 25. Mayer A.E., Pogorelko V.V., and Yalovets A.P. Elastic Waves in Suspensions // *Acoustical Physics*. – 2011. – V. 57. – No. 2. – P. 136-143.
(<http://dx.doi.org/10.1134/S1063771011010088>) [impact-factor JCR 0.880]
 26. Dudarev E.F., Kashin O.A., Markov A.B., Mayer A.E., Tabachenko A.N., Girsova N.V., Bakach G.P., Kitsanov S.A., Zhorovkov M.F., Skosyrskii A.B., and Pochivalova G.P. Deformation behavior and spalling fracture of a heterophase aluminum alloy with ultrafine-grained and coarse-grained structure subjected to a nanosecond relativistic high-current electron beam // *Russian Physics Journal* – 2011. – V. 54. – No. 6. – P. 713-720.
(<http://dx.doi.org/10.1007/s11182-011-9674-4>) [impact-factor JCR 0.671]

Список НИР (гранты) кафедры общей и прикладной физики за 2011-2015 годы

1. Грант Российского научного фонда (проект 14-11-00538) «Разрушение металлов при высокоскоростной деформации растяжения и сдвига»
2. Грант Президента Российской Федерации (проект МД-286.2014.1) «Развитие подходов механики конденсированных сред со структурой и их применение для теоретического исследования изменение структуры и свойств материалов под воздействием интенсивного электронного, ионного и лазерного облучения»
3. Грант Российского фонда фундаментальных исследований (проект 15-32-21039, мол_а_вед) «Перегрев и плавление металлов и других кристаллических материалов в ударных волнах и волнах разгрузки»

4. Грант Российского фонда фундаментальных исследований (проект 14-01-31454, мол_а) «Разработка модели разрушения расплава металла под воздействием интенсивного электронного облучения»
5. Грант Российского фонда фундаментальных исследований (проект 12-02-31375, мол_а) «Развитие многомасштабного подхода для исследования пластической деформации металлов в широком диапазоне размеров зерен и скоростей деформации»
6. Министерство образования и науки Российской Федерации, задание на выполнение научно-исследовательских работ в рамках проектной части государственного задания в сфере научной деятельности (проект 3.1334.2014/К) «Высокоскоростная пластическая деформация в микрообъемах и нанобъемах твердых тел»
7. Министерство образования и науки Российской Федерации, ФЦП «Кадры» (проект 14.В37.21.0384) «Локализация пластического течения при высокоскоростной деформации металлов»