

**Publication list of Prof. Dr. Beata Ziaja-Motyka  
up to 31.08.2019**

**I. Research with Free-Electron Lasers**

**Research Articles:**

- 98 M. Makita et al. (BZ), "*X-ray induced non-thermal transition of bismuth on femtosecond timescales*", Sci. Rep. 9, 602 (2019)
- 97 R. Follath et al. (BZ), "*X-ray induced damage of B4C-coated multilayer materials under various irradiation geometries*", Sci. Rep. 9, 2029 (2019)
- 96 K. Mecseki et al. (BZ), "Hard X-ray induced fast secondary electron cascading processes in solids", Appl. Phys. Lett. 113(11), 114102 (2018)
- 95 J. Bekx et al. (BZ), "Ab-initio calculation of electron impact ionization cross sections for ions in exotic electron configurations", Phys. Rev. A, 98(2), 022701 (2018)
- 94 N. Medvedev, Viktor Tkachenko, V. Lipp, Zheng Li, and B. Ziaja, "*Various damage mechanisms in carbon and silicon materials under femtosecond x-ray irradiation*", 4Open 1,3 (2018).
- 93 Y. Kumagai et al. (BZ), "Radiation-induced chemical dynamics in Ar clusters exposed to strong x-ray pulses", Phys. Rev. Lett., 120(22), 223201 (2018)
- 92 N. Medvedev and B. Ziaja, "*Multistep transition of diamond to warm dense matter state revealed by femtosecond X-ray diffraction*", Sci. Rep. 8, 5284 (2018)
- 91 M. Toufarová et al (BZ), "*Contrasting behavior of covalent and molecular carbon allotropes exposed to extreme ultraviolet and soft x-ray free-electron laser radiation*"  
Phys. Rev. B 96, 214101 (2017)
- 90 C. Fortmann-Grote et al. (BZ), "*Start-to-end simulation of single particle imaging using ultrashort pulses at the European X-ray Free Electron Laser*", IUCrJ 4, 560 (2017)
- 89 V. Tkachenko, V. Lipp, N. Medvedev, B. Ziaja, "*Picosecond Relaxation of X-ray Excited GaAs*", High Energy Density Phys. 24, 15-21 (2017)
- 88 P. Finetti et al. (BZ), "*Pulse Duration of Seeded Free-Electron Lasers*", Phys. Rev. X 7, 021043 (2017)
- 87 F. Tavella et al. (BZ), "*Soft x-ray induced femtosecond solid-to-solid phase transition*", High Energy Density Phys. 24, 22 - 27 (2017)
- 86 N. Medvedev, Z. Li. V. Tkachenko, B. Ziaja, "*Electron-ion coupling in semiconductors beyond Fermi's golden rule*",  
Phys. Rev. B 95(1), 014309 (2017)
- 85 V. Tkachenko, N. Medvedev, B. Ziaja, "*Transient Changes of Optical Properties in Semiconductors*

*in Response to Femtosecond Laser Pulses*",  
Appl. Sci. 6(9) (2016) 238

**84** B. Ziaja, V. Saxena, S.-K. Son, N. Medvedev, B. Barbrel, B. Woloncewicz, M. Stransky, " *Kinetic Boltzmann approach adapted for modeling highly ionized matter created by x-ray irradiation of a solid* ",  
Phys. Rev. E 93 (2016) 053210

**83** C. H. Yoon, M. V. Yurkov, E. A. Schneidmiller, L. Samoylova, A. Buzmakov, Z. Jurek, B. Ziaja, R. Santra, N. D. Loh, T. Tschentscher, A. P. Mancuso, " *A comprehensive simulation framework for imaging single particles and biomolecules at the European X-ray Free-Electron Laser* ",  
Sci. Rep. 6 (2016) 24791

**82** Z. Jurek, S-K. Son, B. Ziaja, R. Santra , " *XMDYN and XATOM: versatile simulation tools for quantitative modeling of X-ray free-electron laser induced dynamics of matter* ",  
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**81** V. Tkachenko, N. Medvedev, Z. Li, P. Piekarz, B. Ziaja , " *Transient optical properties of semiconductors under femtosecond x-ray irradiation* ",  
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**80** V. Saxena, B. Ziaja , " *Hydrodynamic model for expansion and collisional relaxation of x-ray laser-excited multi-component nanoplasma* ",  
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**79** B. Ziaja, N. Medvedev, V. Tkachenko, T. Maltezopoulos, W. Wurth , " *Time-resolved observation of band-gap shrinking and electron-lattice thermalization within X-ray excited gallium arsenide* ",  
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**78** N. Medvedev, A. E. Volkov, B. Ziaja, " *Electronic and atomic kinetics in solids irradiated with free-electron lasers or swift-heavy ions* ",  
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**77** T. Tachibana, Z. Jurek, H. Fukuzawa, K. Motomura, K. Nagaya, S. Wada, P. Johnsson, M. Siano, S. Mondal, Y. Ito, M. Kimura, T. Sakai, K. Matsunami, H. Hayashita, J. Kajikawa, X.-J. Liu, E. Robert, C. Miron, R. Feifel, J. P. Marangos, K. Tono, Y. Inubushi, M. Yabashi, S.-K. Son, B. Ziaja, M. Yao, R. Santra, K. Ueda , " *Nanoplasma formation by high Intensity hard x-rays* ",  
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**76** V. Saxena, Z. Jurek, B. Ziaja, R. Santra , " *Hydrodynamic model for picosecond propagation of laser-created nanoplasmas* ",  
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**75** B. Ziaja, Z. Jurek, N. Medvedev, V. Saxena, S-K. Son, R. Santra, " *Towards realistic simulations of macromolecules irradiated under the conditions of coherent diffraction imaging with an X-ray Free-Electron Laser* ",  
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- 74 N. Medvedev, Z. Li, B. Ziaja , " *Thermal and nonthermal melting of silicon under femtosecond x-ray irradiation* ",  
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- 73 N. Medvedev, V. Tkachenko, B. Ziaja , " *Modeling of nonthermal solid-to-solid phase transition in diamond irradiated with femtosecond X-ray FEL pulse* " ,  
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- 72 B. Ziaja, Z. Jurek, V. Saxena, R. Santra , " *Modeling of nanoplasmas created from finite systems by ultrafast intense X-ray pulses* ",  
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- 71 S.-K. Son, R. Thiele, Z. Jurek, B. Ziaja, R. Santra , " *Quantum-mechanical calculation of Ionization-potential lowering in dense plasmas*",  
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- 70 Z. Jurek, B. Ziaja, R. Santra, " *Applicability of the classical molecular dynamics method to study x-ray irradiated molecular systems*",  
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- 69 N. Medvedev, H. O. Jeschke, B. Ziaja , " *Nonthermal graphitization of diamond induced by a femtosecond X-ray laser pulse*",  
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- 68 B. Ziaja, Z. Jurek, N. Medvedev, S.-K. Son, R. Thiele, S. Toleikis, " *Photoelectron spectroscopy method to reveal ionization potential lowering in nanoplasmas.*",  
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- 67 J. Gaudin, N. Medvedev et al. (B. Ziaja), " *Photon energy dependence of graphitization threshold for diamond irradiated with intense XUV FEL pulse*",  
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- 66 L. Mueller, C. Gutt, B. Pfau, S. Schaffert, J. Geilhufe, F. Buettner, J. Mohanty, S. Flewett, R. Treusch, S. Duesterer, H. Redlin, A. Al-Shemmary, M. Hille, A. Kobs, R. Froemter, H. P. Oepen, B. Ziaja, N. Medvedev, S.-K. Son, R. Thiele, R. Santra, B. Vodungbo, J. Luening, S. Eisebitt, G. Gruebel , " *Breakdown of the X-Ray resonant magnetic scattering signal during intense pulses of extreme ultraviolet free-electron-laser radiation* " ,  
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- 65 N. Medvedev, B. Ziaja, M. Cammarata, M. Harmand, S. Toleikis  
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- 64 R. Riedel, A. Al-Shemmary, M. Gensch, T. Golz, M. Harmand, N. Medvedev, M. J. Prandolini, K. Sokolowski-Tinten, S. Toleikis, U. Wegner, B. Ziaja, N. Stojanovic, F. Tavella , " *Single-shot pulse duration monitor for extreme ultraviolet and X-ray free-electron lasers* " ,  
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- 63 M. Harmand, R. Coffee, M. R. Bionta, M. Chollet, D. French, D. M. Fritz, H. T. Lemke, N.

- Medvedev, B. Ziaja, S. Toleikis, M. Cammarata , *"Achieving few-femtosecond time-sorting at hard X-ray free electron lasers"* ,  
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- 62** N. Medvedev, H. O. Jeschke, B. Ziaja , *"Nonthermal phase transitions in semiconductors induced by a femtosecond extreme ultraviolet laser pulse"* ,  
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- 61** B. Ziaja, H. N. Chapman, R. Fäustlin, S. Hau-Riege, Z. Jurek, A. V. Martin, S. Toleikis, F. Wang, E. Weckert, R. Santra , *"Limitations of coherent diffractive imaging of single objects due to their damage by intense x-ray radiation"* ,  
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- 60** Z. Jurek, R. Thiele, B. Ziaja, R. Santra , *"Effect of two-particle correlations on x-ray coherent diffractive imaging studies performed with continuum models"*,  
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- 59** R. Thiele, S. –K. Son, B. Ziaja, R. Santra , *"Effect of screening by external charges on the atomic orbitals and photoinduced processes within the Hartree-Fock-Slater atom"* ,  
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- 58** B. Ziaja and N. Medvedev , *"Modelling ultrafast transitions within laser-irradiated solids"* ,  
High Energy Density Phys. 8 (2012) 18.
- 57** B. Ziaja, H. N. Chapman, R. Santra, T. Laarmann, E. Weckert, C. Bostedt, T. Möller,  
*"Heterogeneous clusters as a model system for the study of ionization dynamics within tampered samples"* ,  
Phys. Rev. A 84 (2011) 033201.
- 56** F. Wang, E. Weckert, B. Ziaja, D.S.D. Larsson, D. van der Spoel , *"Coherent diffraction of a single virus particle: The impact of a water layer on the available orientational information"* ,  
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- 55** B. Ziaja, A.V. Martin, F. Wang, H.N. Chapman, E. Weckert, *"Theoretical estimation for correlations of diffraction patterns from objects differently oriented in space"*,  
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- 54** S. Hau-Riege et al., *"Near-ultraviolet luminescence of  $N_2$  irradiated by short x-ray pulses"*,  
Phys. Rev. Lett. **105**, 043003 (2010).
- 53** S. Toleikis et al., *"Probing near-solid density plasmas using X-ray scattering"*,  
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- 52** R. Fäustlin et al., *"Observation of ultrafast non-equilibrium collective dynamics in a warm dense hydrogen plasma"*,  
Phys. Rev. Lett 104 (2010), 125002.
- 51** B. Ziaja, T. Laarmann, H. Wabnitz, F. Wang, E. Weckert, C. Bostedt and T. Möller, *"Emission of*

*electrons from rare gas clusters after their irradiation with intense VUV pulses of 100 nm and 32 nm wavelength.*”,

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**50** B. Ziaja, H. Wabnitz, F. Wang, E. Weckert and T. Möller, *”Ionization and expansion dynamics of atomic clusters irradiated with short intense VUV pulses.”*,

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**49** B. Ziaja, F. Wang and E. Weckert, *”Multi-electron-recombination rates estimated within dense plasmas.”*,

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**48** F. Wang, B. Ziaja, E. Weckert, *”Inverse bremsstrahlung cross section estimated within evolving plasmas using effective ion potentials.”*

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**47** B. Ziaja, H. Wabnitz, E. Weckert, T. Möller, *”Atomic clusters of various sizes irradiated with short intense pulses of VUV radiation.”*,

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**46** B. Ziaja, H. Wabnitz, E. Weckert, T. Möller, *”Femtosecond non-equilibrium dynamics of clusters irradiated with short intense VUV pulses.”*,

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**45** B. Ziaja, E. Weckert, T. Möller, *”Statistical model of radiation damage within an atomic cluster irradiated by photons from free-electron-laser.”*,

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**44** B. Ziaja, A. R. B. de Castro, E. Weckert, T. Möller, *”Modelling dynamics of samples exposed to free-electron-laser radiation with Boltzmann equations.”*,

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**43** B. Ziaja, R. A. London, J. Hajdu, *”Ionization by impact electrons in solids: electron mean free path fitted over a wide energy range.”*,

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**41** B. Ziaja, A. Szöke, D. van der Spoel and J. Hajdu, *”Space-time evolution of electron cascades in diamond.”*,

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**40** P. Persson, S. Lunell, A. Szöke, B. Ziaja and J. Hajdu, *”Shake-up and shake-off excitations with associated electron losses in X-ray studies of proteins.”*,

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**39** B. Ziaja, D. van der Spoel, A. Szöke and J. Hajdu, *”Auger-electron cascades in diamond*

*and amorphous carbon.*",  
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### **Conference Proceedings:**

**38** T. Tschentscher et al. (BZ), "Simulations of ultrafast x-ray laser experiments",  
*SPIE Optics + Optoelectronics, Prague, Czech Republic*, Proc. of SPIE 10237, 102370S (2017)

**37** Z. Jurek et al., " Simulations of single-particle imaging of hydrated proteins with x-ray free-electron lasers", *Advances in Computational Methods for X-Ray Optics IV, San Diego, United States, 6 Aug 2017 - 10 Aug 2017*, Proc. of SPIE 10388, 10388OM (2017)

**36** V. Lipp, N. Medvedev, B. Ziaja, "Classical Monte-Carlo simulations of x-ray induced electron cascades in various materials",  
Proc. of SPIE 10239, 102360H (2017)

**35** N. Medvedev, Z. Li, B. Ziaja, " Thermal and nonthermal melting of silicon exposed to femtosecond pulses of X-ray irradiation ",  
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**34** B. Ziaja, Z. Jurek, N. Medvedev, R. Thiele, S. Toleikis , "*A review of environment-dependent processes within FEL excited matter*",  
High Energy Density Phys. 9 (2013) 462-472.

**33** H. O. Jeschke, N. Medvedev, B. Ziaja , "*Non-thermal phase transitions in semiconductors under femtosecond XUV irradiation*",  
Proc. SPIE 8777 (2013) 877709.

**32** B. Ziaja, H. Wabnitz, F. Wang, E. Weckert, "*Ionization and expansion dynamics of atomic clusters irradiated with short intense VUV pulses.*",  
Proceedings of the 16th International Conference on Atomic Processes and Plasmas,  
Monterey, 23-26 March, 2009.

**31** B. Ziaja, H. Wabnitz, F. Wang, E. Weckert, "*Radiation damage within atomic clusters irradiated with intense VUV radiation.*",  
Proceedings of the SPIE Europe, Optics and Optoelectronics, Prague, 20-23 April, 2009.

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## II. High Energy Physics

### Research Articles:

29 B. Ziaja, "Polarized deep inelastic scattering at low Bjorken  $x$  and resummation of logarithmic corrections,  $\ln^2(1/x)$ .",  
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28 B. Ziaja, "Proton spin structure function,  $g_1$ , with the unified evolution equations including NLO DGLAP terms and double logarithms,  $\ln^2(1/x)$ .",  
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27 B. Ziaja, "Double logarithms,  $\ln^2(1/x)$ , and the NLO DGLAP evolution for the non-singlet component of the nucleon spin structure function,  $g_1$ .",  
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26 B. Badełek, J. Kwiecinski and B. Ziaja, "Spin structure function  $g_1(x, Q^2)$  and the DHGMY integral  $I(Q^2)$  at low  $Q^2$ : predictions from the GVMD model.",  
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24 R. Peschanski and B. Ziaja, "Factorial correlators: Angular scaling within QCD jets.",  
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23 L. Motyka and B. Ziaja, "The photon structure and exclusive production of vector mesons in gamma gamma collisions.",  
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22 J. Kwiecinski and B. Ziaja, "QCD predictions for spin dependent photonic structure function  $g_{\gamma 1}(x, Q^2)$  in the low  $x$  region of future linear colliders.",  
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21 J. Kwiecinski and B. Ziaja, "QCD predictions for polarized deep inelastic scattering accompanied by a forward jet in the low  $x$  region of possible HERA measurements.",  
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19 B. Ziaja, "Recovering corrections in the analysis of intermittent data.",  
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16 R. A. Janik and B. Ziaja, "Improved intermittency analysis of single event data.",  
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15 B. Ziaja, "Inclusive single particle density in configuration space from the QCD-cascade in DLA approximation.",  
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14 B. Ziaja, "Multiparton density matrix for the QCD cascade in DLA approximation.",  
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12 B. Ziaja, "Intermittency for coherent and incoherent current ensemble model.",  
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11 B. Ziaja, "Current ensemble model and intermittency.",  
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10 A. Białas and B. Ziaja, "Space-time structure of hadron sources and intermittency.",  
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### Conference Proceedings:

9 B. Badełek, J. Kwiecinski and B. Ziaja, "GVMD model predictions for the low  $Q^2$  behaviour of the spin structure function  $g_1(x, Q^2)$  and of the DHGHY integral  $I(Q^2)$ ", conference talk given at the "10th International Workshop on Deep Inelastic Scattering (DIS2002), Krakow, Poland, 30 April - 4 May 2002",  
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7 J. Kwiecinski and B. Ziaja, "QCD predictions for the spin-dependent structure function  $g_1(x, Q^2)$  of the photon in the low  $x$  region of future  $ey$  colliders.",  
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6 J. A. Aguilar-Saavedra et al. [ECFA/DESY LC Physics Working Group Collaboration],  
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"Proceedings of the Workshop, World Scientific, 1998", 506.

4 J. Kwiecinski, B. Ziaja, "QCD predictions for  $g_1$  at small  $x$  incorporating double  $\ln^2(1/x)$  resummation", conference talk,  
"Proceedings of Workshop on Physics with Polarized Protons at Hera: 1st Meeting, Hamburg, Germany, 6-7 March 1997", "Proceedings of the Workshop on Physics with Polarized Protons at Hera: 2nd Meeting, Hamburg, Germany, 26-27 May 1997", and "Proceedings of Workshop on Physics with Polarized Protons at Hera: 3rd and Final Meeting, Hamburg, Germany, 30-31 Aug 1997.". Also in  
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## Habilitation Thesis

1 B. Ziaja, "Analiza spolaryzowanego rozpraszania głębokonieelastycznego w obszarze małych wartości zmiennej  $x$  Bjorkena z uwzględnieniem resumacji poprawek logarytmicznych,  $\ln^2(1/x)$ .", Rep. 1922/PH of the INP, Krakow, April 2003, 23 pages. Thesis (in Polish) was written in partial fulfillment of the requirements for the degree of Doctor Habilitatus at the Institute of Nuclear Physics in Krakow. The English translation of the title is: "Analysis of the polarized deep inelastic scattering at low values of Bjorken  $x$ , including the resummation of logarithmic corrections,  $\ln^2(1/x)$ ".

