Ph.D. Artur P. Durajski

Curriculum Vitae

Personal Details

name **Artur Piotr Durajski**

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Education

2011-2014 **Ph.D. in Theoretical Physics**, University of Zielona Góra.

2006-2011 **M.Sc. in Physics**, Częstochowa University of Technology.

Work Experience

since 2017 **President of the Polish Physical Society**, *Częstochowa branch*.

since 2016 **Head of the Department of Solid State Physics**, *Institute of Physics, Częstochowa University of Technology*.

since 2014 **Assistant professor**, *Institute of Physics, Częstochowa University of Technology*.

Research Interests

Conventional superconductivity, *Thermodynamic properties of phonon-mediated superconductors; Strongly correlated superconductivity; Strong-coupling Eliashberg theory; Influence of pressure and doping on the superconducting state; Hydrogen and hydrogen-rich compounds; Carbon materials*.

High-temperature superconductivity, *Thermodynamic properties of hole- and electron-doped high-T_C superconductors; Modified electron-phonon pairing mechanism; d-wave superconductors; Anisotropy of the gap parameter in the hole-doped cuprates*.

Publications

[2018] 65. **A. Durajski**, R. Szczęśniak, *Physica C 554, 38–43 (2018)*.
Gradual reduction of the superconducting transition temperature of H_3S by partial replacing sulfur with phosphorus

64. **A. Durajski**, R. Szczęśniak, *J. Chem. Phys. 149, 074101 (2018)*.
Structural, electronic, vibrational, and superconducting properties of hydrogenated chlorine

63. P. Tarasewicz, R. Szczęśniak, **A. Durajski**, *Physica C 552, 1–18 (2018)*.
The half-filled superconducting system with on-site inter-band interactions

62. R. Szczęśniak, **A.P. Durajski**, M.W. Jarosik, *Physica B 536, 773–776 (2018)*.
Ab-initio study of superconducting state in intercalated $MoSe_2$ and WSe_2 bilayers

61. R. Szczęśniak, M.W. Jarosik, P. Tarasewicz, **A.P. Durajski**, *Physica B 536, 726–729 (2018)*.
Multi-band description of the specific heat and thermodynamic critical field in MgB_2 superconductor

60. R. Szczęśniak, **A.P. Durajski**, *Sci. Rep. 8, 6037 (2018)*.
Unusual sulfur isotope effect and extremely high critical temperature in H_3S superconductor

59. M.W. Jarosik, R. Szczęśniak, **A.P. Durajski**, J.K. Kalaga, W. Leoński, *Chaos 28, 013126 (2018)*.
Influence of external extrusion on stability of hydrogen molecule and its chaotic behavior

58. R. Szczęśniak, **A.P. Durajski**, A.M. Duda, P. Tarasewicz, *J. Supercond. Nov. Magn. 31, 19-28 (2018)*.
Diagram of the critical temperature - Nernst temperature for the superconductivity induced by modified electron-phonon interaction

57. R. Szczęśniak, **A.P. Durajski**, M.W. Jarosik, *Front. Phys. 13, 137401 (2018)*.
Strong-coupling superconductivity induced by calcium intercalation in bilayer transition-metal dichalcogenides

[2017]

56. **A.P. Durajski**, R. Szczęśniak, *Phys. Lett. A 381, 3332-3336 (2017)*.
Doping dependence of critical temperature for superconductivity induced by hole-phonon interaction

55. R. Szczęśniak, **A.P. Durajski**, M.W. Jarosik, *J. Phys. Chem. Solids 111, 254-257 (2017)*.
Metallization and superconductivity in Ca-intercalated bilayer MoS_2

54. **A.P. Durajski**, R. Szczęśniak, *Sci. Rep. 7, 4473 (2017)*.
First-principles study of superconducting hydrogen sulfide at pressure up to 500 GPa

53. **A.P. Durajski**, R. Szczęśniak, *Acta Phys. Pol. A 131, 1051-1053 (2017)*.
On the magnetic penetration depth in superconducting ultrathin lead films

52. R. Szczęśniak, **A.P. Durajski**, A.M. Duda, *Ann. Phys. (Berlin) 529, 1600254 (2017)*.
Pseudogap in the Eliashberg approach based on electron-phonon and electron-electron-phonon interaction

51. R. Szczęśniak, **A.P. Durajski**, *Solid State Commun. 249, 30-33 (2017)*.
The isotope effect in H_3S superconductor

[2016]

50. **A.P. Durajski**, *Sci. Rep. 6, 38570 (2016)*.
Quantitative analysis of nonadiabatic effects in dense H_3S and PH_3 superconductors

49. B. Wiendlocha, R. Szczęśniak, **A.P. Durajski**, M. Muras, *Phys. Rev. B 94, 134517 (2016)*.
Pressure effects on the unconventional superconductivity of noncentrosymmetric $LaNiC_2$

48. **A.P. Durajski**, M.K Paliwoda, R. Szczęśniak, *Solid State Sci. 61, 215–219 (2016)*.
Superconductivity in the intermetallic borocarbides YPd_2B_2C, YPt_2B_2C and $LaPt_2B_2C$

47. D. Szczęśniak, **A.P. Durajski**, A. Khater, D. Ghader, *Europhys. Lett. 114, 48001 (2016)*.
Energy band gaps in graphene nanoribbons with corners

46. R. Szczęśniak, **A.P. Durajski**, *J. Supercond. Nov. Magn. 29, 1779–1786 (2016)*.
Non-BCS temperature dependence of energy gap in thin film electron-doped cuprates

45. **A.P. Durajski**, *Front. Phys. 11, 117408 (2016)*.
Anisotropic evolution of energy gap in superconducting Bi2212

44. R. Szczęśniak, **A.P. Durajski**, *Front. Phys. 11, 117406 (2016)*.
Superconductivity well above room temperature in compressed MgH_6

43. R. Szczęśniak, **A.P. Durajski**, K.M. Skoczylas, Ł. Herok, *J. Low Temp. Phys. 183, 387–398 (2016)*.
Low-temperature thermodynamic properties of superconducting antiperovskite $CdCNi_3$

42. **A.P. Durajski**, R. Szczęśniak, L. Pietronero, *Ann. Phys. (Berlin) 528, 358–364 (2016)*.
High-temperature study of superconducting hydrogen and deuterium sulfide

41. R. Szczęśniak, **A.P. Durajski**, D. Szczęśniak, *Phys. Status Solidi B 253, 538–544 (2016)*.
Thermodynamic parameters of Zr superconductor at ω-β structural phase transition

[2015] 40. R. Szczęśniak, **A.P. Durajski**, *Eur. Phys. J. B 88, 342 (2015)*.
Detailed study of the superconducting properties in compressed germane

39. **A.P. Durajski**, *Phys. Status Solidi B 252, 2167–2173 (2015)*.
A comparison of two high-pressure superconducting phases in yttrium

38. **A.P. Durajski**, *Supercond. Sci. Technol. 28, 095011 (2015)*.
Effect of layer thickness on the superconducting properties in ultrathin Pb films

37. R. Szczęśniak, **A.P. Durajski**, K.M Skoczylas, *Physica B 475, 66–72 (2015)*.
Comparison study of superconductivity in zirconium and hafnium based electron-doped layered chloronitrides

36. **A.P. Durajski**, R. Szczęśniak, Y. Li, *Physica C 515, 1–6 (2015)*.
Non-BCS thermodynamic properties of H_2S superconductor

35. P.W. Pach, R. Szczęśniak, **A.P. Durajski**, *Acta Phys. Pol. A 127, 231–233 (2015)*.
Pressure dependence of the thermodynamic critical field in francium

34. **A.P. Durajski**, *Solid State Sci. 42, 20–24 (2013)*.
Characterization of phonon-mediated superconductivity in lithium doping borocarbide

33. **A.P. Durajski**, *Supercond. Sci. Technol. 28, 035002 (2015)*.
Influence of hole doping on the superconducting state in graphane

32. R. Szczęśniak, **A.P. Durajski**, *J. Supercond. Nov. Magn. 28, 19–24 (2015)*.
Description of high-temperature superconducting state in BSLCO compound

31. R. Szczęśniak, **A.P. Durajski**, Ł. Herok, *Solid State Commun. 203, 63–68 (2015)*.
Thermodynamic properties of antiperovskite $MgCNi_3$ in superconducting phase

[2014] 30. R. Szczęśniak, **A.P. Durajski**, Ł. Herok, *Phys. Scripta 89, 125701 (2014)*.
Theoretical description of the $SrPt_3P$ superconductor in the strong coupling limit

29. R. Szczęśniak, **A.P. Durajski**, *Supercond. Sci. Technol. 27, 125004 (2014)*.
Anisotropy of the gap parameter in the hole-doped cuprates

28. **A.P. Durajski**, R. Szczęśniak, *Supercond. Sci. Technol. 27, 115012 (2014)*.
Properties of pressure-induced superconducting state in trihydrides ScH_3 and LaH_3

27. R. Szczęśniak, **A.P. Durajski**, *Acta Phys. Pol. A, 126, A-92 (2014)*.
On the ratio of the energy gap amplitude to the critical temperature for cuprates

26. **A.P. Durajski**, D. Szczęśniak, R. Szczęśniak, *Solid State Commun. 200, 17–21 (2014)*.
Study of superconducting phase in silicene under biaxial tensile strain

25. **A.P. Durajski**, *Eur. Phys. J. B 87, 210 (2014)*.
Phonon-mediated superconductivity in compressed NbH_4 compound

24. **A.P. Durajski**, R. Szczęśniak, A.M Duda, *Solid State Commun. 195, 55–60 (2014)*.
High temperature superconducting properties of atomic hydrogen at 802 GPa

23. **A.P. Durajski**, R. Szczęśniak, *Solid State Commun. 192, 93–97 (2014)*.
Strong-coupling superconductivity in $CaLi_2$ under the pressure of 100 GPa

22. **A.P. Durajski**, R. Szczęśniak, *Acta Phys. Pol. A 126, 342–343 (2014)*.
On the thermodynamic critical field for the K_3C_{60} and Rb_3C_{60} fullerides

21. D. Szczęśniak, **A.P. Durajski**, R. Szczęśniak, *J. Phys.: Condens. Matter 26, 255701 (2014)*.
Influence of lithium doping on the thermodynamic properties of graphene based superconductors

20. R. Szczęśniak, **A.P. Durajski**, *J. Supercond. Nov. Magn. 27, 1363–1367 (2014)*.
The energy gap in the $(Hg_{1-x}Sn_x)Ba_2Ca_2Cu_3O_{8+y}$ superconductor

19. **A.P. Durajski**, R. Szczęśniak, *Mod. Phys. Lett. B 28, 1450052 (2014)*.
Estimation of superconducting parameters for silane at high pressure

18. R. Szczęśniak, **A.P. Durajski**, P.W. Pach, *Cryogenics 61, 38–42 (2014)*.
On the thermodynamic properties of the Rb_3C_{60} superconductor

17. R. Szczęśniak, D. Szczęśniak, **A.P. Durajski**, *Solid State Commun. 184, 6–11 (2014)*.
Thermodynamics of the superconducting phase in compressed $GeH_4(H_2)_2$

16. M.W. Jarosik, **A.P. Durajski**, *Mod. Phys. Lett. B 28, 1450010 (2014)*.
Investigation of the superconducting phase in metallic hydrogen near the pressure of metallization

15. R. Szczęśniak, **A.P. Durajski**, *Supercond. Sci. Technol. 27, 015003 (2014)*.
The superconducting state above the boiling point of liquid nitrogen in the GaH_3 compound

14. R. Szczęśniak, **A.P. Durajski**, P.W. Pach, *J. Phys. Chem. Solids 75, 224–229 (2014)*.
Superconductivity in α-polonium at the reduced volume

[2013] 13. R. Szczęśniak, **A.P. Durajski**, *Solid State Sci. 25, 45–54 (2013)*.
The thermodynamic properties of the high-pressure superconducting state in the hydrogen-rich compounds

12. R. Szczęśniak, **A.P. Durajski**, *Solid State Commun. 172, 5–9 (2013)*.
The high-pressure superconductivity in SiH_4: the strong-coupling approach

11. R. Szczęśniak, **A.P. Durajski**, P.W. Pach, *Phys. Scripta 88, 025704 (2013)*.
$CaLi_2$ superconductor under the pressure of 100 GPa: the thermodynamic critical field and the specific heat

10. R. Szczęśniak, **A.P. Durajski**, D. Szczęśniak, *Solid State Commun. 165, 39–44 (2013)*.
Study of the superconducting state in the Cmmm phase of GeH_4 compound

9. R. Szczęśniak, **A.P. Durajski**, P.W. Pach, *J. Low Temp. Phys. 171, 769–778 (2013)*.
The high pressure superconductivity of $CaLi_2$ compound: the thermodynamic properties

8. R. Szczęśniak, **A.P. Durajski**, *J. Phys. Chem. Solids 74, 641–646 (2013)*.
The characterization of high-pressure superconducting state in Si_2H_6 compound: the strong-coupling description

7. **A.P. Durajski**, *Physica C 485, 145–148 (2013)*.
Study of thermodynamic properties of $SiH_4(H_2)_2$ superconductor under high pressure

6. R. Szczęśniak, **A.P. Durajski**, *Solid State Commun. 153, 26–30 (2013)*.
On the critical temperature and the energy gap in dense $SiH_4(H_2)_2$ at 250 GPa

[2012]

5. **A.P. Durajski**, R. Szczęśniak, M.W. Jarosik, *Phase Transit. 85, 727–734 (2012)*.
Properties of the superconducting state in compressed sulphur

4. R. Szczęśniak, **A.P. Durajski**, *Solid State Commun. 152, 1018–1022 (2012)*.
The superconducting phase of calcium under pressure at 200 GPa: strong-coupling description

3. R. Szczęśniak, **A.P. Durajski**, M.W. Jarosik, *Mod. Phys. Lett. B 26, 1250050 (2012)*.
Specific heat and thermodynamic critical field for calcium under the pressure at 120 GPa

2. R. Szczęśniak, **A.P. Durajski**, *J. Supercond. Nov. Magn. 25, 399–404 (2012)*.
Thermodynamics of the superconducting state in Calcium at 200 GPa

1. R. Szczęśniak, **A.P. Durajski**, *Physica C 472, 15–20 (2012)*.
Superconductivity of calcium in phase VI

Honours and Awards

2018 Scholarships for Outstanding Young Scientists from the Polish Ministry of Science and Higher Education.

2017 Research grant from the National Science Center (NCN) under the Sonata programme.

2017 Scholarships from the Foundation for Polish Science (FNP) under the START programme.

2016 Częstochowa University of Technology Rector's Award of the first degree for a publications on the superconductivity in low-dimensional systems

2015 Częstochowa University of Technology Rector's Award of the first degree for a publications on the theory of high-temperature superconductivity.

2014 Distinction from the Polish Physical Society for Ph.D. dissertation entitled "The thermodynamic properties of the high-pressure superconducting state in hydrogen-rich compounds".

2014 Częstochowa University of Technology Rector's Award of the first degree for a series of publications on the theory of superconductivity.

2014 Scholarship from the Polish Ministry of Science and Higher Education for outstanding scientific achievements.

2013 Częstochowa University of Technology Rector's Award of the second degree for original and creative scientific achievements.

2013 Distinction from the Polish Physical Society for M.Sc. thesis entitled "Analysis of the superconducting state in the selected systems at high-pressure: the Eliashberg formalism".

Selected Conferences

1. 12th International Conference on Materials and Mechanism of Superconductivity and High Temperature Superconductors, China, Beijing (2018)
2. The 21th Czech-Polish-Slovak Optical Conference on Wave and Quantum Aspects of Contemporary Optics, Czech Republic, Lednice (2018)
3. XVIII National Conference on Superconductivity, Poland, Krynica Morska (2017)
4. 2nd International Conference on Magnetism and Superconductivity in Selected Systems, Poland, Zakopane (2016)
5. 16th Czech and Slovak Conference on Magnetism, Slovakia, Kosice (2016)
6. 1st International Workshop SUPERHYDRIDES, Italy, Roma (2016)
7. XVII National Conference on Superconductivity, Poland, Karpacz (2015)
8. From Spins to Cooper Pairs: New Physics of the Spins, Poland, Zakopane (2014)
9. The European Conference Physics of Magnetism 2014, Poland, Poznań (2014)
10. XVI National Conference on Superconductivity, Poland, Zakopane (2013)
11. 6th Workshop on Current Problems in Physics, Poland, Zielona Góra (2013)
12. International Conference on Diamond and Carbon Materials, Italy, Riva del Garda (2013)
13. 15th Czech and Slovak Conference on Magnetism, Slovakia, Kosice (2013)
14. 19th International Seminar on Physics and Chemistry of Solids and advanced materials, Poland, Częstochowa (2013)
15. 18th International Seminar on Physics and Chemistry of Solids, Ukraine, Lviv (2012)
16. International Conference on Quantum Fluids and Solids, United Kingdom, Lancaster (2012)
17. The European Conference Physics of Magnetism 2011, Poland, Poznań (2011)

Scientific Internship

VI - IX 2015 The Department of Physics, University of Rome La Sapienza, Rome, Italy

II 2015 The Institute of Complex Systems, National Research Council, Rome, Italy

Journal Referee

Wiley Interdisciplinary Reviews: Computational Molecular Science, Scientific Reports, The Journal of Physical Chemistry, Solid State Communications, Physica Status Solidi B, Physica Status Solidi RRL, Chinese Physics Letters, Advances in Mathematical Physics, Optical and Quantum Electronics, Frontiers of Physics, Physics Letters A, Acta Physica Polonica A

Journal Editor

since 2018 Frontiers in Nanotechnology

2014–2015 Advances in Condensed Matter Physics

Languages

Polish Mothertongue

English Intermediate

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