CURRICULUM VITAE

Ochbadrakh CHULUUNBAATAR

Personal Information:

Date of Birth: 24 July 1974

Place of Birth: Ulaanbaatar, Mongolia

Education:

1992 – 1996 Faculty of Mathematics, National University of Mongolia.

Academic degrees:

1998 Master of Science in Numerical Mathematics: *"Some mathematical questions of the few-body problem in quantum mechanics"*, Supervisor: Prof. Kh. Tsookhuu, National University of Mongolia.

2002 Candidate of Sciences in Physics and Mathematics: *"The Newton variation-iteration schemes for numerical study of the three-body quantum systems"*, Supervisors: Profs. I.V. Puzynin and S.I. Vinitsky, JINR.

2010 Doctor of Sciences in Physics and Mathematics: *"The variation-projective methods for investigation of few-body quantum systems"*, Scientific advisers: Profs. I.V. Pusynin and S.I. Vinitsky, JINR.

2018 Full member of Mongolian Academy of Sciences.

Specialization:

Mathematical Modelling, Numerical Methods and Program Complexes.

Professional Career:

1997 – 1999 Lecturer of the Department of Applied Mathematics, SMCS NUM.

1999 – 2006 Junior Scientist, LCTA/LIT JINR.

2006 – 2010 Senior Scientist, LIT JINR.

2010 – 2011 Leading Scientist, LIT JINR.

2011 – 2019 Head of Division for Calculations of Complex Physical Systems, LIT JINR.

Since 2019 Deputy Director, MLIT JINR.

Scientific-Organizational Activities:

2007 – 2020 Head of National Group of Mongolia in JINR.

Since 2012 Member of the Scientific-Technical Council of MLIT JINR.

Since 2019 Member of the Dissertation Council for IT and Computational Physics of JINR.

Bibliography:

Results of the scientific activities have been published in more than 230 articles.

Awards, Prizes:

2011 Medal for 90th Anniversary of Mongolian People's Revolution.

2011 Certificate of Honor of the Governor of Dubna, Russian Federation.

2012 Honorary worker of Science of Mongolia.

2012 Laureate of the State Prize of Mongolia.

2016 Letter of Thanks of the Governor of Moscow region, Russian Federation.

2021 Certificate of Honor of the Ministry of Science and Higher Education of the Russian Federation.

2023 Order of the Polar Star of Mongolia.

Present Position:

Meshcheryakov Laboratory of Information Technologies, Joint Institute for Nuclear Research, Dubna, Moscow Region 141980, Russia

Permanent Position:

Institute of Mathematics and Digital Technology, Mongolian Academy of Sciences, Ulaanbaatar, Mongolia

Scientific Interests:

Computational physics, mathematical modelling, variational and numerical methods in the few-body problem. High accuracy uncoupled correlated calculations of energy of helium isoelectronic bound states. Impact ionization of helium by fast electron or proton in Born's approximation. A multi-channel scattering problem and exact solvable models: Schwinger iteration-variational method, Kantorovich method of reducing a boundary problem to the coupled ordinary differential equations, Monte-Carlo methods, etc.

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I. List of scientific papers published in refereed journals

1. B. Batgerel, S.I. Vinitsky, **O. Chuluunbaatar**, J. Buša Jr., Yu.A. Blinkov, A.A. Gusev, A. Deveikis, G. Chuluunbaatar, V. Ulziibayar, *Schemes of finite element method for solving multidimensional boundary value problems*, Journal of Mathematical Sciences **279**, pp. 738–755 (2024).

2. A.S. Zaytsev, D.S. Zaytseva, S.A. Zaytsev, L.U. Ancarani, **O. Chuluunbaatar**, K.A. Kouzakov, Yu.V. Popov, *Single ionization of helium by protons of various energies in the parabolic quasi-sturmians approach*, Atoms **11**, pp. 124–1–15 (2023).

3. A.A. Gusev, **O. Chuluunbaatar**, V.L. Derbov, R.G. Nazmitdinov, S.I. Vinitsky, P.W. Wen, C.J. Lin, H. M. Jia, L.L. Hai, *Symbolic-numerical algorithm for solving the problem of heavy ion collisions in an optical model with a complex potential*, Lecture Notes in Computer Science **14139**, pp. 128–140 (2023).

4. A.A. Gusev, G. Chuluunbaatar, **O. Chuluunbaatar**, S.I. Vinitsky, Yu.A. Blinkov, A. Deveikis, P.O. Hess, L.L. Hai, *Hermite interpolation polynomials on parallelepipeds and FEM applications*, Mathematics in Computer Science **17**, Article number: 18, 1–15 (2023).

5. V.L. Derbov, A.A. Gusev, **O. Chuluunbaatar**, L.L. Hai, S.I. Vinitsky, E.M. Kazaryan and H.A. Sarkisyan, *Crossing points in spectra and light absorption in spheroidal and cone-shaped quantum dots*, Springer Proceedings in Physics **281**, pp. 129–144 (2022).

6. G. Chuluunbaatar, **O. Chuluunbaatar**, A.A. Gusev, S.I. Vinitsky, *PI-type fully symmetric quadrature rules on the 3-, ..., 6-simplexes*, Computers & Mathematics with Applications **124**, pp. 89–97 (2022).

7. **O. Chuluunbaatar**, A.A. Gusev, S.I. Vinitsky and A.G. Abrashkevich, P.W. Wen, C.J. Lin, *KANTBP 3.1: A program for computing energy levels, reflection and transmission matrices, and corresponding wave functions in the coupled-channel and adiabatic approaches*, Comput. Phys. Commun. **278**, pp. 108397–1–14 (2022).

8. Yu.V. Popov, I.P. Volobuev, **O. Chuluunbaatar**, S. Houamer, *Compton ionization of atoms as a new method of spectroscopy of outer shells*, Physics of Particles and Nuclei **53**, pp. 191–196 (2022).

9. M. Kircher, F. Trinter, S. Grundmann, G. Kastirke, M. Weller, I. Vela-Perez, A. Khan, C. Janke, M. Waitz, S. Zeller, T. Mletzko, D. Kirchner, V. Honkimäki, S. Houamer, **O. Chuluunbaatar**, Yu.V. Popov, I.P. Volobuev, M.S. Schöffler, L.Ph.H. Schmidt, T. Jahnke and R. Dörner, *Ion and electron momentum distributions from single and double ionization of helium induced by Compton scattering*, Phys. Rev. Lett. **128**, pp. 053001–1–6 (2022).

10. **O. Chuluunbaatar**, S. Houamer, Yu.V. Popov, I.P. Volobuev, M. Kircher, R. Dörner, *Compton double ionization of the helium atom: Can it be a method of dynamical spectroscopy of ground state electron correlation?*, Journal of Quantitative Spectroscopy and Radiative Transfer **278**, pp. 108020–1–9 (2022).

11. **O. Chuluunbaatar**, B.B. Joulakian, G. Chuluunbaatar, J. Buša Jr., G.O. Koshcheev, *Accurate calculations for the Dirac electron in the field of two-center Coulomb field: Application to heavy ions*, Chem. Phys. Lett. **784**, pp. 139099–1–9 (2021).

12. G. Chuluunbaatar, A. Gusev, V. Derbov, S. Vinitsky, **O. Chuluunbaatar**, L.L. Hai and V. Gerdt, *A Maple implementation of the finite element method for solving boundary-value problems for systems of second-order ordinary differential equations*, Communications in Computer and Information Science **1414**, pp. 152–166 (2021).

13. **O. Chuluunbaatar**, S. Houamer, Yu. V. Popov, I.P. Volobuev, M. Kircher, R. Dörner, *Compton ionization of atoms as a method of dynamical spectroscopy*, Journal of Quantitative Spectroscopy and Radiative Transfer **272**, pp. 107820–1–8 (2021).

14. P.W. Wen, C.J. Lin, R.G. Nazmitdinov, S.I. Vinitsky, **O. Chuluunbaatar**, A.A. Gusev, A.K. Nasirov, H.M. Jia, A. Góźdź, *Potential roots of the deep subbarrier heavy-ion fusion hindrance phenomenon within the sudden approximation approach*, Phys. Rev. **C 103**, pp. 054601–1–6 (2021).

15. V.L. Derbov, G. Chuluunbaatar, A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, A. Góźdź, P.M. Krassovitskiy, I. Filikhin, A.V. Mitin, *Spectrum of beryllium dimer in ground $X^1\Sigma_g^+$ state*, Journal of Quantitative Spectroscopy and Radiative Transfer **262**, pp. 107529–1–10 (2021).

16. S.I. Vinitsky, P.W. Wen, A.A. Gusev, **O. Chuluunbaatar**, R.G. Nazmitdinov, A.K. Nasirov, C.J. Lin, H.M. Jia, A. Góźdź, *Application of KANTBP program of finite element method in the coupled-channels calculations for heavy-ion fusion reactions*, Acta Physica Polonica B Proceedings Supplement **13**, pp. 549–558 (2020).

17. S. Houamer, **O. Chuluunbaatar**, I.P. Volobuev and Yu.V. Popov, *Compton ionization of hydrogen atom near threshold by photons in the energy range of a few keV: nonrelativistic approach*, Eur. Phys. J. **D 74**, pp. 81–1–9 (2020).

18. M. Kircher, F. Trinter, S. Grundmann, I. Vela-Perez, S. Brennecke, N. Eicke, J. Rist, S. Eckart, S. Houamer, **O. Chuluunbaatar**, Yu.V. Popov, I.P. Volobuev, K. Bagschik, M.N. Piancastelli, M. Lein, T. Jahnke, M.S. Schöffler and R. Dörner, *Kinematically complete experimental study of Compton scattering at helium atoms near the threshold*, Nature Physics **16**, pp. 756–760 (2020).

19. **O. Chuluunbaatar**, S. Obeid, B.B. Joulakian, A.A. Gusev, P.M. Krassovitskiy, L.A. Sevastianov, *D_{3h} symmetry adapted correlated three center wave functions of the ground and the first five excited states of H_3^+*, Chem. Phys. Lett. **746**, pp. 137304–1–8 (2020).

20. P.W. Wen, **O. Chuluunbaatar**, A.A. Gusev, R.G. Nazmitdinov, A.K. Nasirov, S.I. Vinitsky, C.J. Lin and H.M. Jia, *Near-barrier heavy-ion fusion: Role of boundary conditions in coupling of channels*, Phys. Rev. **C 101**, pp. 014618–1–10 (2020).

21. A.A. Gusev, S.I. Vinitsky, **O. Chuluunbaatar**, A. Góźdź, A. Dobrowolski, K. Mazurek, P.M. Krassovitskiy, *Finite element method for solving the collective nuclear model with tetrahedral symmetry*, Acta Physica Polonica B Proceedings Supplement **12**, pp. 589–594 (2019).

22. **O. Chuluunbaatar**, K.A. Kouzakov, S.A. Zaytsev, A.S. Zaytsev, V.L. Shablov, Yu.V. Popov, H. Gassert, M. Waitz, H.-K. Kim, T. Bauer, A. Laucke, Ch. Müller, J. Voigtsberger, M. Weller, J. Rist, K. Pahl, M. Honig, M. Pitzer, S. Zeller, T. Jahnke, L. Ph. H. Schmidt, H. Schmidt-Böcking, R. Dörner and M.S. Schöffler, *Single ionization of helium by fast proton impact in different kinematical regimes*, Phys. Rev. **A 99**, pp. 062711–1–11 (2019).

23. Т. Жанлав, Х. Отгондорж, **О. Чулуунбаатар**, *Семейства оптимальных двух- и трех-точечных итераций, не содержащих производные для решения нелинейных уравнений*, ЖВМиМФ **59**, сс. 920–936 (2019), Computational Mathematics and Mathematical Physics **59**, pp. 864–880 (2019).

24. Y.V. Popov, A. Galstyan, B. Piraux, P.F. O'Mahony, F. Mota-Furtado, P. Decleva, **O. Chuluunbaatar**, *Separable potentials model for atoms and molecules in strong ultrashort laser pulses*, Springer Series in Chemical Physics (Book chapter) **119**, pp. 221–242 (2019).

25. A.A. Gusev, S.I. Vinitsky, **O. Chuluunbaatar**, A. Góźdź, V.L. Derbov and P. M. Krassovitskiy, *Adiabatic representation for atomic dimers and trimers in collinear configuration*, Physics of Atomic Nuclei **81**, pp. 945–970. (2018).

26. A.A. Gusev, V.P. Gerdt, **O. Chuluunbaatar**, G. Chuluunbaatar, S.I. Vinitsky, V.L. Derbov, A. Góźdź, P.M. Krassovitskiy, *Symbolic-numerical algorithms for solving elliptic boundary-value problems using multivariate simplex lagrange elements*, Lecture Notes in Computer Science **11077**, pp. 197–213 (2018).

27. **O. Chuluunbaatar**, S.I. Vinitsky, A.A. Gusev, V.L. Derbov and P.M. Krassovitskiy, *Solution of quantum mechanical problems using finite element method and parametric basis functions*, Bulletin of the Russian Academy of Sciences: Physics **82**, pp. 654–660 (2018).

28. **O. Chuluunbaatar**, S.I. Vinitsky, A.A. Gusev, V.L. Derbov and P.M. Krassovitskiy, *Quantum transparency of barriers and reflection from wells for clusters of identical particles*, Bulletin of the Russian Academy of Sciences: Physics **82**, pp. 648–653 (2018).

29. A. Galstyan, Yu.V. Popov, N. Janssens, F. Mota-Furtado, P.F. O'Mahony, P. Decleva, N. Quadri, **O. Chuluunbaatar**, B. Piraux, *Ionisation of H_2O by a strong ultrashort XUV pulse: a model within the single active electron approximation*, Chemical Physics **504**, pp. 22–30 (2018).

30. **O. Chuluunbaatar**, S.A. Zaytsev, K.A. Kouzakov, A. Galstyan, V.L. Shablov and Yu.V. Popov, *Fully differential cross sections for singly ionizing 1-MeV p+He collisions at small momentum transfer: Beyond the first Born approximation*, Phys. Rev. **A 96**, pp. 042716–1–7 (2017).

31. T. Zhanlav, **O. Chuluunbaatar** and V. Ulziibayar, *Accelerating the convergence of Newton-type iterations*, J. Numer. Anal. Approx. Theory **46**, pp. 162–180 (2017).

32. T. Zhanlav, **O. Chuluunbaatar** and V. Ulziibayar, *Generating function method for constructing new iterations*, Applied Mathematics and Computation **315**, pp. 414–423 (2017).

33. A.A. Gusev, V.P. Gerdt, **O. Chuluunbaatar**, G. Chuluunbaatar, S.I. Vinitsky, V.L. Derbov, A. Góźdź, *Symbolic-numerical algorithms for solving the parametric self-adjoint 2D elliptic boundary-value problem using high-accuracy finite element method*, Lecture Notes in Computer Science **10490**, pp. 151–166 (2017).

34. A.A. Gusev, V.P. Gerdt, **O. Chuluunbaatar**, G. Chuluunbaatar, S.I. Vinitsky, V.L. Derbov, A. Góźdź, *Symbolic-numerical algorithm for generating interpolation multivariate hermite polynomials of high-accuracy finite element method*, Lecture Notes in Computer Science **10490**, pp. 134–150 (2017).

35. Т. Жанлав, В. Улзийбаяр, **О. Чулуунбаатар**, *Необходимые и достаточные условия сходимости двух и трехшаговых итераций Ньютоновского типа*, ЖВМиМФ **57**, сс. 1093–1102 (2017), Computational Mathematics and Mathematical Physics **57**, pp. 1090–1100 (2017).

36. S. Obeid, **O. Chuluunbaatar** and B.B. Joulakian, *(e, 2e) simple ionization of H_3^+ by fast electron impact: use of triangular three-center continuum and bound state wave functions*, J. Phys. **B 50**, pp. 145201–1–9 (2017).

37. A.A. Gusev, S.I. Vinitsky, **O. Chuluunbaatar**, V.L. Derbovd, A. Góźdź, P.M. Krassovitskiy, *Transmission of clusters consisting of a few identical particles through barriers and wells*, Acta Physica Polonica B Proceedings Supplement **10**, pp. 269–274 (2017).

38. A. Galstyan, Yu.V. Popov, F. Mota-Furtado, P.F. O'Mahony, N. Janssens, S.D. Jenkins, **O. Chuluunbaatar** and B. Piraux, *Modelling laser-atom interactions in the strong field regime*, Eur. Phys. J. **D 71**, pp. 97–1–11 (2017).

39. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, V.L. Derbov, A. Góźdź, *Algorithms for solving the parametric self-adjoint 2D elliptic boundary-value problem using high-accuracy finite element method*, RUDN Journal of MIPh **25**, pp. 36–55 (2017).

40. А.А. Гусев, **О. Чулуунбаатар**, С.И. Виницкий, А. Гуждж, *Метод конечных элементов решения краевых задач для квантово-механических систем*, Вестник Российско-Армянского университета. Физико-математические и естественные науки **1**, сс. 12–25 (2017).

41. T. Zhanlav, **O. Chuluunbaatar**, V. Ulziibayar, *Higher-order numerical solution of two-dimensional coupled Burgers' equations*, American Journal of Computational Mathematics **6**, pp. 120–129 (2016).

42. S.I. Vinitsky, A.A. Gusev, **O. Chuluunbaatar**, A. Góźdź and V.L. Derbov, *The coupled-channel method for modelling quantum transmission of composite systems*, Communications in Computer and Information Science. **678**, pp. 525–537 (2016).

43. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, L.L. Hai, V.L. Derbov and P.M. Krassovitskiy, *Model of diatomic homonuclear molecule scattering by atom or barriers*, Communications in Computer and Information Science. **678**, pp. 511–524 (2016).

44. A.A. Gusev, S.I. Vinitsky, **O. Chuluunbaatar**, V.L. Derbov, *Solution of the boundary-value problem for a systems of odes of large dimension: benchmark calculations in the framework of Kantorovich method*, Вестник РУДН: Серия Математика. Информатика. Физика. **3**, pp. 31–37 (2016).

45. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, L.L. Hai, V.L. Derbov, A. Góźdź, *Algorithms and programs for solving boundary-value problems for systems of second-order odes with piecewise constant potentials: multichannel scattering and eigenvalue problems*, Вестник РУДН: Серия Математика. Информатика. Физика. **3**, pp. 38–52 (2016).

46. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, V.L. Derbov, *Algorithms for solving the boundary-value problems for atomic trimers in collinear configuration using the kantorovich method*, Вестник РУДН: Серия Математика. Информатика. Физика. **4**, pp. 56–76 (2016).

47. A. Galstyan, **O. Chuluunbaatar**, A. Hamido, Yu.V. Popov, F. Mota-Furtado, P.F. O'Mahony, N. Janssens, F. Catoire and B. Piraux, *Erratum: Reformulation of the strong-field approximation for light-matter interactions [Phys. Rev. A 93, 023422 (2016)]*, Phys. Rev. **A 94**, pp. 029901(E)–1–1 (2016).

48. A.A. Gusev, V.P. Gerdt, L.L. Hai, V.L. Derbov, S.I. Vinitsky, **O. Chuluunbaatar**, *Symbolic-numeric algorithms for solving BVPs for a system of ODEs of the second order: multichannel scattering and eigenvalue problems*, Lecture Notes in Computer Science **9890**, pp. 212–227 (2016).

49. Z.N. Ozer, E. Ali, M. Dogan, M. Yavuz, O. Alwan, A. Naja, **O. Chuluunbaatar**, B.B. Joulakian, C.-G. Ning, J. Colgan and D. Madison, *Comparison of experimental and theoretical triple differential cross sections for the single ionization of CO_2 $(1\pi_g)$ by electron impact*, Phys. Rev. **A 93**, pp. 062707–1–6 (2016).

50. H. Gassert, **O. Chuluunbaatar**, M. Waitz, F. Trinter, H.-K. Kim, T. Bauer, A. Laucke, Ch. Müller, J. Voigtsberger, M. Weller, J. Rist, M. Pitzer, S. Zeller, T. Jahnke, L.Ph.H. Schmidt, J. B. Williams, S.A. Zaytsev, A.A. Bulychev, K.A. Kouzakov, H. Schmidt-Böcking, R. Dörner, Yu.V. Popov and M.S. Schöffler, *Agreement of experiment and theory on the single ionization of helium by fast proton impact*, Phys. Rev. Lett. **116**, pp. 073201–1–6 (2016).

51. A. Galstyan, **O. Chuluunbaatar**, A. Hamido, Yu.V. Popov, F. Mota-Furtado, P.F. O'Mahony, N. Janssens, F. Catoire and B. Piraux, *Reformulation of the strong-field approximation for light-matter interactions*, Phys. Rev. **A 93**, pp. 023422–1–14 (2016).

52. А.А. Гусев, С.И. Виницкий, **О. Чулуунбаатар**, В.Л. Дербов, А. Гуждж, П.М. Красовицкий, *Метастабильные состояния составной системы при туннелировании через отталкивающие барьеры*, Теоретическая математическая физика **186**, сс. 27–50 (2016), Theoretical and Mathematical Physics **186**, 21–40 (2016).

53. A.A. Gusev, L.L. Hai, **O. Chuluunbaatar**, V. Ulziibayar, S.I. Vinitsky, V.L. Derbov, A. Góźdź and V.A. Rostovtsev, *Symbolic-numeric solution of boundary-value problems for the Schrödinger equation using the finite element method: scattering problem and resonance states*, Lecture Notes in Computer Science **9301**, pp. 182–197 (2015).

54. O. Alwan, **O. Chuluunbaatar**, X. Assfeld, B.B. Joulakian, *Theoretical study of $(\gamma, 2e)$ photo-double ionization of CO_2 in the equal energy sharing regime using Dyson orbitals and the parameterized three center continuum wave function*, J. Phys. **B 48**, pp. 185203–1–7 (2015).

55. T. Zhanlav, **O. Chuluunbaatar** and V. Ulziibayar, *Higher-order accurate numerical solution of unsteady Burgers' equation*, Applied Mathematics and Computation **250**, pp. 701–707 (2015).

56. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, A.G. Abrashkevich, *Description of the FORTRAN program KANTBP 3.0 for computing energy levels, reflection and transmission matrices, and corresponding wave functions in the coupled-channel adiabatic approach*, Mathematical Modelling and Geometry **3**, pp. 22–49 (2015).

57. T. Zhanlav, **O. Chuluunbaatar** and V. Ulziibayar, *A brief description of two-sided approximation for some Newton's type methods*, Математическое Моделирование **26**, сс. 71–77 (2014).

58. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, A.G. Abrashkevich, V.L. Derbov, *Numerical solution of elliptic boundary-value problems for Schrödinger-type equations using the Kantorovich method*, Mathematical Modelling and Geometry **2**, pp. 54–80 (2014).

59. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, A.G. Abrashkevich, *Algorithm for computing a wave packet evolution of the time-dependent Schrödinger equation*, Mathematical Modelling and Geometry **2**, pp. 33–53 (2014).

60. O. Alwan, **O. Chuluunbaatar**, X. Assfeld, A. Naja, B.B. Joulakian, *(e,2e) simple ionization of CO_2 by fast electron impact: use of three-center parameterized continuum wave function and Dyson orbitals*, J. Phys. **B 47**, pp. 225201–1–7 (2014).

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62. S.I. Vinitsky, A.A. Gusev, **O. Chuluunbaatar**, L.L. Hai, V.L. Derbov, P.M. Krassovitskiy, A. Góźdź, *Symbolic numerical algorithm for solving quantum tunneling problem of a diatomic molecule through repulsive barriers*, Lecture Notes in Computer Science **8660**, pp. 472–490 (2014).

63. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky, V.L. Derbov, A. Góźdź, L.L. Hai, V.A. Rostovtsev, *Symbolic-numerical solution of boundary-value problems with self-adjoint second-order differential equation using the finite element method with interpolation Hermite polynomials*, Lecture Notes in Computer Science **8660**, pp. 138–154 (2014).

64. A.A. Gusev, **O. Chuluunbaatar**, S.I. Vinitsky and A.G. Abrashkevich, *POTHEA: A program for computing eigenvalues and eigenfunctions and their first derivatives with respect to the parameter of the parametric self-adjoined 2D elliptic partial differential equation*, Comput. Phys. Commun. **185**, pp. 2636–2654 (2014).

65. P. Bolognesi, B. Joulakian, A.A. Bulychev, **O. Chuluunbaatar** and L. Avaldi, *Photo-double-ionization of the nitrogen molecule*, Phys. Rev. **A 89**, pp. 053405–1–5 (2014).

66. A.A. Gusev, S.I. Vinitsky, **O. Chuluunbaatar**, A. Góźdź, V.L. Derbov, *Resonance tunnelling of clusters through repulsive barriers*, Physica Scripta **89**, pp. 054011–1–7 (2014).

67. T. Zhanlav, **O. Chuluunbaatar** and V. Ulziibayar, *Two-sided approximation for some Newton's type methods*, Applied Mathematics and Computation **236**, pp. 239–246 (2014).

68. M.S. Schöffler, H.-K. Kim, **O. Chuluunbaatar**, S. Houamer, A.G. Galstyan, J.N. Titze, T.Jahnke, L.Ph.H. Schmidt, H. Schmidt-Böcking, R. Dörner, Yu.V. Popov and A.A. Bulychev, *Transfer excitation reactions in fast proton-helium collisions*, Phys. Rev. **A 89**, pp. 032707–1–9 (2014).

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III. List of Fortran codes

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