

CURRICULUM VITAE

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Date of birth: December 19, 1959
Citizenship: Russia
Marital status: married, two children



EDUCATION

Budker Institute of Nuclear Physics, 630090, Novosibirsk, Russia
Doctor's Degree in physics and mathematics sciences (2014)
Dissertation: "Accelerator based epithermal neutron source"

Budker Institute of Nuclear Physics, 630090, Novosibirsk, Russia
Candidate's Degree in physics and mathematics sciences (1996)
Dissertation: "Particularities of hot plasma accumulation by atomic beams in AMBAL mirrors"

Novosibirsk State University, 630090, Novosibirsk, Russia
Physical Faculty: Graduated (1983)
Specialty: physics
Thesis: "Measurement of plasma ion temperature by Rutherford scattering of fast atoms"

Secondary school, Seika, Altay Republic, Russia
Graduated (1977)

TEACHING EXPERIENCE

Physical-mathematical college # 130, Novosibirsk, Russia
Physics teacher (1991-1993)

Novosibirsk State University, 630090, Novosibirsk, Russia
Assistance Professor (1993-2014)
Leading Researcher (2014-2016)
Head of BNCT Laboratory (2016 to date)

PROFESSIONAL AFFILIATIONS

Budker Institute of Nuclear Physics, 630090, Novosibirsk, Russia
Post-graduate (1983-1986)
Junior researcher (1986-1989)
Researcher (1989-1996)
Senior researcher (1996-2014)
Leading researcher (2014-2019)
Chief researcher (2019 to date)
Head of Laboratory (2022 to date)

Joint Institute for Nuclear Research, 141980 Dubna, Russia
Director's Advisor (2022 to date)

Lebedev Physical Institute, 119991 Moscow, Russia
Chief researcher (2024 to date)

RESEARCH FIELDS

Epithermal neutron source, accelerators of charged particles, boron neutron capture therapy, plasma physics, neutral and ion beams.

MAJOR ACHIEVEMENT

Inventor of the accelerator based neutron source VITA, recognized as the best solution for Boron Neutron Capture Therapy.

The first facility VITA at BINP site is actively used for the development of the BNCT technique and for other applications, the second facility VITA-II α is used to treat patients at the BNCT center in Xiamen, China (China becomes second country in the world to perform BNCT), the third facility VITA-II β made for Blokhin National Medical Research Center of Oncology in Moscow for conducting clinical trials in Russia and subsequent treatment of patients, the fourth facility VITA-III α is being designed to equip Burnazyan Federal Medical and Biological Center in Moscow.

PUBLICATIONS FOR 2019-2024

Monographs:

1. D. Berkivits, P. Brown, J. Chai, S. Charisopoulos, H. Fritzsche, T. Gutberlet, K. Kardjilov, Y. Kiyonagi, G. Klujber, A.J. Kreiner, C-H. Lee, D.W. Lee, H. Mavric, F. Ott, J. Plante, M. Roth, E. Sengbusch, I.P. Swainson, M. Sztejnberg, H. Tanaka, S. Taskaev, K. Thomsen, R. Verna. IAEA-TECDOC-1981 "Compact Accelerator Based Neutron Sources". International Atomic Energy Agency, Vienna, Austria, 2021. - 126 p.
2. "Road map" in the field of nuclear physics / Ed. L.V. Grigorenko. - M.: RAS, 2021. - 78 p.
3. M. Ahmed, D. Alberti, S. Altieri, ... S. Taskaev, ... K. Tsuchida. Advances in Boron Neutron Capture Therapy. International Atomic Energy Agency, Vienna, Austria, June 2023, 416 p. CRCP/BOR/002, ISBN: 978-92-0-132723-9.
4. S. Taskaev. Accelerator based neutron source VITA. M.: FIZMATLIT, 2024. - 248 p. + 8 p. color on - ISBN 978-5-9221-1979-5.

Patents:

5. A.I. Kasatova, D.A. Kasatov, S.Yu. Taskaev. A method for determining the absorbed dose from thermal neutrons during boron-neutron capture therapy of malignant tumors. Patent for invention No. 2709682 dated December 19, 2019.
6. S. Uspenskij, P. Haptahanova, A. Zaboronok, T. Kupkin, A. Zeleneckij, M. Selyanin, S. Taskaev. Method of producing a composition for boron neutron capture therapy of malignant tumors (embodiments). Patent for invention No. 2729458 dated 04/30/2020.
7. S. Taskaev. Method for producing a beam of epithermal neutrons. Patent for invention No. 2722965 dated 06/05/2020.
8. Yu. Taskaeva, S. Taskaev. Method for determining the absorbed dose of recoil nuclei. Patent for invention No. 2743417 dated 02/18/2021.
9. S. Uspenskij, P. Haptahanova, A. Zaboronok, T. Kupkin, A. Zeleneckij, M. Selyanin, S. Taskaev. Method of producing a composition for boron neutron capture therapy of malignant tumors (embodiments). WO 2020/246913, 10.12.2020.
10. S. Taskaev, A. Makarov, E. Sokolova. Systems, devices, and methods for deformation reduction and resistance in metallic bodies. United States Patent no. US 2022/0030696 A1, Jan. 27, 2022.
11. S. Uspenskij, P. Haptahanova, A. Zaboronok, T. Kupkin, A. Zeleneckij, M. Selyanin, S. Taskaev. Method of producing a composition for boron neutron capture therapy of

malignant tumors (embodiments). Chinese Patent No. CN 114072656 B dated 03/10/2023.

Articles:

12. S. Taskaev. Development of an Accelerator-Based Epithermal Neutron Source for Boron Neutron Capture Therapy. *Physics of Particles and Nuclei*, 2019, Vol. 50, No. 5, pp. 569–575.
13. T. Bykov, D. Kasatov, A. Koshkarev, A. Makarov, V. Porosev, G. Savinov, I. Shchudlo, S. Taskaev. A multichannel neutron flux monitoring system for a boron neutron capture therapy facility. *JINST* 14 (2019) P12002.
14. Byvaltsev, V.A., Zavjalov, E.L., Kanygin, V.V., Kasatova, A.I., Kichigin, A.I., Razumov, I.A., Sycheva, T.V., Taskaev, S.Y. Cytopathic effects of accelerator-based boron neutron capture therapy on human glioblastoma cells. *Siberian Journal of Oncology*, V. 18, Iss. 4, 2019, Pages 34-42.
15. Ia. Kolesnikov, A. Koshkarev, S. Taskaev, I. Shchudlo. Diagnostics of the Efficiency of a Gas Stripping Target of a Tandem Accelerator with Vacuum Insulation. *Instruments and Experimental Techniques*, 2020, Vol. 63, No. 3, pp. 314–318.
16. S.A. Uspenskii, P.A. Khaptakhanova, A.A. Zaboronok, T.S. Kurkin, O.Yu. Volkova, L.V. Mechetina, A.V. Taranin, V.V. Kanygin, Matsumura Akira, and S.Yu. Taskaev. Elemental Boron Nanoparticles: Production by Ultrasonication in Aqueous Medium and Application in Boron Neutron Capture Therapy. *Doklady Chemistry*, 2020, Vol. 491, Part 1, pp. 45–48.
17. D. Kasatov, A. Koshkarev, A. Makarov, G. Ostreinov, S. Taskaev, I. Shchudlo. A fast-neutron source based on a vacuum-insulated tandem accelerator and a lithium target. *Instruments and Experimental Techniques*, 2020, Vol. 63, No. 5, pp. 611–615.
18. Ia. Kolesnikov, I. Sorokin, and S. Taskaev. Increasing the electric strength of a Vacuum-Insulated Tandem Accelerator. *Instruments and Experimental Techniques*, 2020, Vol. 63, No. 6, pp. 807–815.
19. M. Dymova, S. Taskaev, V. Richter, E. Kuligina. Boron neutron capture therapy: current status and future perspectives. *Cancer Communications*, 2020; 40:406-421.
20. A. Shoshin, A. Burdakov, M. Ivantsivskiy, S. Polosatkin, M. Klimenko, A. Semenov, S. Taskaev, D. Kasatov, I. Shchudlo, A. Makarov, N. Davydov. Qualification of Boron Carbide Ceramics for Use in ITER Ports. *IEEE Transactions on Plasma Science*. June 2020. V. 48. Iss. 6. P. 1474-1478.
21. E. Zavjalov, A. Zaboronok, V. Kanygin, A. Kasatova, A. Kichigin, R. Mukhamadiyarov, I. Razumov, T. Sycheva, B. Mathis, S. Maezono, A. Matsumura & S. Taskaev. Accelerator-based boron neutron capture therapy for malignant glioma: a pilot neutron irradiation study using boron phenylalanine, sodium borocaptate and liposomal borocaptate with a heterotopic U87 glioblastoma model in SCID mice. *International Journal of Radiation Biology*, 2020, Vol. 96, № 7, p. 868-878.
22. T. Bykov, N. Goloshevskii, S. Gromilov, D. Kasatov, Ia. Kolesnikov, A. Koshkarev, A. Makarov, A. Ruktuev, I. Shchudlo, E. Sokolova, S. Taskaev. In situ study of the blistering effect of copper with a thin lithium layer on the neutron yield in the ${}^7\text{Li}(p,n){}^7\text{Be}$ reaction. *Nuclear Inst. and Methods in Physics Research B* 481 (2020) 62–81.
23. D. Kasatov, Ia. Kolesnikov, A. Koshkarev, A. Makarov, E. Sokolova, I. Shchudlo, S. Taskaev. Method for in situ measuring the thickness of a lithium layer. *JINST* 15 (2020) P10006.
24. T. Bykov, D. Kasatov, Ia. Kolesnikov, A. Koshkarev, A. Makarov, G. Ostreinov, E. Sokolova, S. Taskaev, I. Shchudlo. A study of the spatial charge effect on 2-MeV proton beam transport in an accelerator-based epithermal neutron source. *Technical Physics*, 2021, Vol. 66, No. 1, pp. 98–102.
25. A. Makarov, E. Sokolova, S. Taskaev. The luminescence of a lithium target under irradiation with a proton beam. *Instruments and Experimental Techniques*, 2021, Vol. 64, No. 1, pp. 24–27.

26. T. Bykov, D. Kasatov, A. Koshkarev, A. Makarov, V. Porosev, G. Savinov, I. Shchudlo, S. Taskaev, G. Verkhovod. Initial trials of a dose monitoring detector for boron neutron capture therapy. *JINST* 2021, vol. 16, P01024.
27. S. Taskaev. Boron neutron capture therapy. *Physics of Atomic Nuclei*, 2021, Vol. 84, No. 2, pp. 207–211.
28. A. Shoshin, A. Burdakov, M. Ivantsivskiy, S. Polosatkin, A. Semenov, Yu. Sulyaev, E. Zaitsev, P. Polozova, S. Taskaev, D. Kasatov, I. Shchudlo, M. Bikchurina. Test results of boron carbide ceramics for ITER port protection. *Fusion Engineering and Design* 168 (2021) 112426.
29. S. Taskaev, E. Berendeev, M. Bikchurina, T. Bykov, D. Kasatov, I. Kolesnikov, A. Koshkarev, A. Makarov, G. Ostreinov, V. Porosev, S. Savinov, I. Shchudlo, E. Sokolova, I. Sorokin, T. Sycheva, G. Verkhovod. Neutron Source Based on Vacuum Insulated Tandem Accelerator and Lithium Target. *Biology* 10 (2021) 350.
30. Ya. Kolesnikov, G. Ostreinov, P. Ponomarev, S. Savinov, S. Taskaev, I. Shchudlo. Measuring the Current of a Beam of Argon Ions Accompanying a Beam of Protons in a Tandem Accelerator with Vacuum Insulation. *Instruments and Experimental Techniques*, 2021, Vol. 64, No. 4, pp. 503–507.
31. T. Bykov, D. Kasatov, Ia. Kolesnikov, A. Koshkarev, A. Makarov, I. Shchudlo, E. Sokolova, S. Taskaev. Measurement of the ${}^7\text{Li}(p,p'\gamma){}^7\text{Li}$ reaction cross-section and 478 keV photon yield from a thick lithium target at proton energies from 0.7 to 1.85 MeV. *Applied Radiation and Isotopes*, 175 (2021) 109821.
32. M. Dymova, M. Dmitrieva, E. Kuligina, V. Richter, S. Savinov, I. Shchudlo, T. Sycheva, I. Taskaeva, S. Taskaev. Method of measuring high-LET particles dose. *Radiation Research* 196 (2021) 192-196.
33. T. Bykov, A. Ivanov, D. Kasatov, Ia. Kolesnikov, A. Koshkarev, G. Ostreinov, A. Makarov, I. Shchudlo, E. Sokolova, S. Taskaev. High flux accelerator-based neutron source. *Issues of atomic science and technology, Series: Thermonuclear fusion* 44(2) (2021) 145-147.
34. S. Taskaev, T. Bykov, D. Kasatov, Ia. Kolesnikov, A. Koshkarev, A. Makarov, S. Savinov, I. Shchudlo, E. Sokolova, Measurement of the ${}^7\text{Li}(p,p'\gamma){}^7\text{Li}$ reaction cross-section and 478 keV photon yield from a thick lithium target at proton energies from 0.65 MeV to 2.225 MeV. *Nuclear Inst. and Methods in Physics Research, B* 502 (2021) 85-94.
35. Kanygin V.V., Kasatova A.I., Razumov I.A., Zavjalov E.L., Kichigin A.I., Mukhamadiyarov R.A., Taskaev S.Yu. Assessment of the effect of boron neutron capture therapy on tumor cell lines and primary embryonic cell culture. *Siberian Journal of Oncology*. 2021; 20(3): 56–66.
36. M. Vorobyeva, M. Dymova, D. Novopashina, E. Kuligina, V. Timoshenko, Ia. Kolesnikov, S. Taskaev, V. Richter, A. Venyaminova. Tumor Cell-Specific 2'-Fluoro RNA Aptamer Conjugated with Closo-Dodecaborate as a Potential Agent for Boron Neutron Capture Therapy. *International Journal of Molecular Sciences*, 22 (2021) 7326.
37. M. Bikchurina, T. Bykov, D. Kasatov, Ia. Kolesnikov, A. Makarov, I. Shchudlo, E. Sokolova, S. Taskaev. The measurement of the neutron yield of the ${}^7\text{Li}(p,n){}^7\text{Be}$ reaction in lithium targets. *Biology* 10 (2021) 824.
38. A. Zaboronok, S. Taskaev, O. Volkova, L. Mechetina, A. Kasatova, T. Sycheva, K. Nakai, D. Kasatov, A. Makarov, Ia. Kolesnikov, I. Shchudlo, T. Bykov, E. Sokolova, A. Koshkarev, V. Kanygin, A. Kichigin, B. Mathis, E. Ishikawa and A. Matsumura. Gold Nanoparticles Permit In Situ Absorbed Dose Evaluation in Boron Neutron Capture Therapy for Malignant Tumors. *Pharmaceutics* 13 (2021) 1490.
39. V. Kanygin, A. Kasatova, E. Zavjalov, I. Razumov, S. Kilesnikov, A. Kichigin, O. Solovieva, A. Tsygankova, S. Taskaev, D. Kasatov, T. Sycheva, V. Byvaltsev. Effects of boron neutron capture therapy on the growth of subcutaneous xenografts of human colorectal adenocarcinoma SW-620 in immunodeficient mice. *Bulletin of Experimental Biology and Medicine*, 172(9) (2021) 356-361.

40. T. Bykov, D. Kasatov, A. Koshkarev, A. Makarov, V. Leonov, V. Porosev, G. Savinov, S. Savinov, I. Shchudlo, S. Taskaev, G. Verkhovod. Evaluation of depth-dose profiles in a water phantom at the BNCT facility at BINP. *JINST* 16 (2021) P10016.
41. T. Popova, M. Dymova, L. Koroleva, O. Zakharova, V. Lisitskiy, V. Raskolupova, T. Sycheva, S. Taskaev, V. Silnikov, T. Godovikova. Homocystamide conjugates of human serum albumin as a platform to prepare bimodal multidrug delivery systems for boron-neutron capture therapy. *Molecules* 26 (2021) 6537.
42. V. Kanygin, I. Razumov, A. Zaboronok, E. Zavjalov, A. Kichigin, O. Solovieva, A. Tsygankova, T. Guselnikova, D. Kasatov, T. Sycheva, B. Mathis, S. Taskaev. Dose-dependent suppression of human glioblastoma xenograft growth by accelerator-based boron neutron capture therapy with simultaneous use of two boron-containing compounds. *Biology* 10 (2021) 1124.
43. V. Kanygin, A. Kichigin, A. Zaboronok, A. Kasatova, E. Petrova, A. Tsygankova, E. Zavjalov, B. Mathis and S. Taskaev. In vivo Accelerator-based Boron Neutron Capture Therapy for Spontaneous Tumors in Large Animals: Case Series. *Biology* 11 (2022) 138.
44. A. Shoshin, A. Burdakov, M. Ivantsivskiy, R. Reichle, V. Udintsev, J. Guirao, S. Pak, A. Zvonkov, D. Kravtsov, N. Sorokina, Y. Sulyaev, A. Listopad, D. Gavrilenko, A. Taskaev, E. Shabunin, V. Seryomin, S. Shiyankov, E. Zaytcev, P. Seleznev, A. Semenov, S. Polosatkin, S. Taskaev, D. Kasatov, I. Shchudlo, M. Bikchurina, V. Modestov, A. Smirnov, A. Pozhilov, A. Lobachev, I. Loginov, O. Shagniev, I. Kirienko, I. Buslakov. Integration of ITER diagnostic ports at the Budker institute. *Fusion Engineering and Design* 178 (2022) 113114.
45. A. Zaboronok, P. Khaptakhanova, S. Uspenskii, R. Bekarevich, L. Mechetina, O. Volkova, B. Mathis, V. Kanygin, E. Ishikawa, A. Kasatova, D. Kasatov, I. Shchudlo, T. Sycheva, S. Taskaev, A. Matsumura. Polymer-Stabilized Elemental Boron Nanoparticles for Boron Neutron Capture Therapy: Initial Irradiation Experiments. *Pharmaceutics* 14 (2022) 761.
46. K. Aiyzhy, E. Barmina, I. Zavestovskaya, A. Kasatova, D. Petrunya, O. Uvarov, V. Saraykin, M. Zhilnikova, V. Voronov, G. Shafeev, S. Taskaev, I. Zelepukin, S. Deyev. Laser ablation of Fe₂B target enriched in ¹⁰B content for boron neutron capture therapy. *Laser Physics Letters* 19 (2022) 066002.
47. M. Bikchurina, T. Bykov, Ia. Kolesnikov, A. Makarov, G. Ostreinov, S. Savinov, S. Taskaev, I. Shchudlo. Measuring the Phase Portrait of an Ion Beam in a Tandem Accelerator with Vacuum Insulation. *Instruments and Experimental Techniques*, 2022, Vol. 65, No. 4, pp. 551–561.
48. S. Taskaev, M. Bikchurina, T. Bykov, D. Kasatov, Ia. Kolesnikov, A. Makarov, G. Ostreinov, S. Savinov, E. Sokolova. Cross-section measurement for the ⁷Li(p,α)⁴He reaction at proton energies 0.6 - 2 MeV. *Nuclear Inst. and Methods in Physics Research B* 525 (2022) 55-61.
49. A. Ivanov, A. Smirnov, S. Taskaev, B. Bayanov, Yu. Belchenko, V. Davydenko, A. Dunaevsky, I. Emelev, D. Kasatov, A. Makarov, M. Meekins, N. Kuksanov, S. Popov, R. Salimov, A. Sanin, I. Sorokin, T. Sycheva, I. Shudlo, D. Vorob'ev, V. Cherepkov, S. Fadeev. Accelerator-based neutron source for boron neutron capture therapy. *Physics—Uspekhi*, Vol.65, № 8, 2022, pp. 834-851.
50. N. Svishcheva, S. Uspenskii, N. Sedush, P. Khaptakhanova, A. Kasatova, A. Buzin, P. Dmitryakov, M. Piskarev, A. Aleksandrov, S. Taskaev. Biodegradable boron-containing poly(lactic acid) for fertilizers with prolonged action. *Materials Today Communications* 33 (2022) 104514.
51. M. Bikchurina, T. Bykov, E. Byambatseren, I. Ibrahim, D. Kasatov, Ia. Kolesnikov, V. Konovalova, A. Koshkarev, A. Makarov, G. Ostreinov, S. Savinov, E. Sokolova, I. Sorokin, I. Shchudlo, T. Sycheva, G. Verkhovod, S. Taskaev. High Flux Neutron Source for Various Applications. *Journal of Neutron Research* 24 (2022) 273-279.
52. D. Novopashina, M Dymova, A. Davydova, M. Meschaninova, D. Malysheva, E. Kuligina, V. Richter, Ia. Kolesnikov, S. Taskaev, M. Vorobyeva. Optamers for

- addressed boron delivery in BNCT: Effect of boron cluster attachment site on functional activity. *International Journal of Molecular Sciences* 24 (2023) 306.
53. E. Byambatseren, A. Burdakov, T. Bykov, D. Kasatov, Ia. Kolesnikov, S. Savinov, T. Sycheva, S. Taskaev. Validation and optimization of the epithermal neutron flux detector using the $^{71}\text{Ga}(n,\gamma)^{72}\text{Ga}$ reaction. *JINST* 18 (2023) P02020.
 54. I. Taskaeva, A. Kasatova, D. Surodin, N. Bgatova, S. Taskaev. Study of Lithium Biodistribution and Nephrotoxicity in Skin Melanoma Mice Model: The First Step towards Implementing of Lithium Neutron Capture Therapy. *Life* 13 (2023) 518.
 55. A. Romashchenko, D. Petrovskii, S. Trotsky, K. Morozova, N. Illarionova, M. Zhukova, E. Kiseleva, M. Sharapova, D. Zuev, K. Kuper, S. Taskaev, A. Kasatova, D. Kasatov, O. Solovieva, I. Razumov, L. Gerlinskaya, M. Moshkin, Y. Moshkin. Quantitative tracking of trans-synaptic nose-to-brain transport of nanoparticles and its modulation by odor, aging, and Parkinson's disease. *Nano Research* 16(5) (2023) 7119-7133.
 56. V. Raskolupova, M. Wang, M. Dymova, G. Petrov, I. Shchudlo, S. Taskaev, T. Abramova, T. Godovikova, V. Silnikov, T. Popova. Design of the new closedodecarborate-containing gemcitabine analogue for the albumin-based theranostics composition. *Molecules* 28 (2023) 2672.
 57. S. Dyusenova, D. Klyamer, A. Sukhikh, I. Shchudlo, S. Taskaev, T. Basova, S. Gromilov. Influence of Magnetic Field on the Structure and Sensor Properties of Thin Titanyl Phthalocyanine Layers. *Journal of Structural Chemistry* 64(3) (2023) 337-346.
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 64. V. Potsellev, S. Uspenskii, E. Trofimchuk, A. Bolshakova, A. Kasatova, D. Kasatov, and S. Taskaev. Nanocomposite Materials Based on Polylactide and Gold Com-2 plex Compounds for Absorbed Dose Diagnostics in BNCT. *International Journal of Molecular Sciences* 24 (2023) 16492.
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 66. Y. Taskaeva, A. Kasatova, A. Shatruck, S. Taskaev, N. Bgatova. The Expression of Markers of Acute Kidney Injury Kim1 and NGAL after Administration of High Doses of Lithium Carbonate in Mice with Engrafted Skin Melanoma B16. *Bulletin of Experimental Biology and Medicine* 176(5) (2024) 567–571.

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68. G. Abdrashitov, V. Kapitonov, Ia. Kolesnikov, S. Savinov, N. Singatulina, Sh. Singatulin, I. Sorokin, and S. Taskaev. Compact Accelerator-Based Fast Neutron Source for the Radiation Testing of Promising Materials. *Physics of Particles and Nuclei Letters*, 2024, Vol. 21, No. 3, pp. 346–351.
69. M. Bikchurina, T. Bykov, D. Kasatov, I. Kolesnikov, E. Sokolova, I. Shchudlo, and S. Taskaev. Study of the Accumulation of Impurities in a Thin Lithium Target by Ion Scattering Spectroscopy. *Physics of Particles and Nuclei Letters*, 2024, Vol. 21, No. 3, pp. 395–399.
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