Georgy Alekseev:

Curriculum Vitae

Born: 29 May 1949 in USSR, nationality Russian

Profile: mathematical physics and continuous mechanics,
mathematical methods in General Relativity,
nonlinear equations and integrability

Position:
Leading researcher
in Steklov Mathematical Institute
of the Russian Academy of Sciences
Moscow, Russia

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Education:

1967/09-1972/06 student of the Department of Mechanics and Mathematics of Moscow State University

1972/10-1975/10 postgraduate student at the Department of Mechanics and Mathematics of Moscow State University

Experience:

1975/11-1985/11 junior researcher,
1985/11-2001/05 senior researcher,
2001/05-present time leading researcher
in Department of Mechanics
of Steklov Mathematical Institute

1976/06 1st scientific degree "Candidate of Physical and Mathematical Sciences" from Moscow State University
Thesis: ``Radiation and propagation of waves in strong gravitational fields"
Scientific advisors: L.I.Sedov and N.R.Sibgatullin
Referees: V.I.Arnold and V.A.Belinski:

2000/05 2nd scientific degree "Doctor of Physical and Mathematical Sciences" from Steklov Mathematical Institute
Thesis: ``Theory of integrable reductions of Einstein equations: the monodromy transfom approach"
Referees: V.E.Zakharov, A.K.Pogrebkov, S.Yu.Dobrohotov:

Research activity:

G.A.Alekseev has specialized in the areas of mathematical physics, continuous mechanics and theory of nonlinear integrable equations. He had published more than 50 scientific papers on the mathematical methods in General Relativity and Gravitation.

Main results:

1. Perturbation theory for coupled gravitational and electromagnetic waves on the Reissner-Nordstrom black hole background (with N.R.Sibgatullin, 1974).
2. Construction of soliton solutions for Einstein – Maxwell equations (1980).
3. Formulation of a general approach to solution of integrable symmetry reductions of Einstein equations -- the ``monodromy transform approach'' and derivation of the linear singular integral equation form of symmetry reduced Einstein-Maxwell-Weyl equations (1985)
4. Derivation of the ``integral evolution equations'' for solution of the characteristic initial value problems for hyperbolic integrable symmetry reductions of Einstein equations (2001).
5. Applications of the linear singular integral equations solving the inverse problem of this monodromy transform to construction of exact solutions: for a Schwarzschild black hole in a homogeneous external field (with A.Garcia, 1996), for colliding plane waves and inhomogeneous cosmologies (with J.B.Griffiths, 2000), for superposition of two Reissner-Nordstrom sources (with V.A.Belinski, 2007).

Main Publications:

1. G.A. Alekseev and V.A. Belinski, ``Equilibrium configurations of two charged masses in General Relativity", Phys. Rev. D 76, 021501(R) (2007); arXiv:0706.1981v1 [gr-qc].

2. G.A. Alekseev and V.A. Belinski, "Schwarzschild black hole hovering in the field of a Reissner-Nordstr\"om naked singularity", Il Nuovo Cimento, **B**, N.2 (2007) (5 pages).

3. G. A. Alekseev, ``Integrability of generalized (matrix) Ernst equations in string theory", Theoretical and Mathematical Physics, **144**(2): 1065–1074 (2005); Translated from Teoreticheskaya i Matematicheskaya Fizika, Vol. 144, No. 2, pp. 214–225, August, 2005; arXiv:hep-th/0410246 v2 02 Mar 2005.

4. G. A. Alekseev, `` Monodromy-data parameterization of the space of local solutions of integrable reductions of einstein's field equations'' Theoretical and Mathematical Physics, **143**(2): 720–740 (2005) Translated from Teoreticheskaya i Matematicheskaya Fizika, **143**, No. 2, pp. 278-304, May, 2005; arXiv:gr-qc/0503043 v1 09 Mar 2005.

5. G. A. Alekseev and J. B. Griffiths, ``Collision of plane gravitational and electromagnetic waves in a Minkowski background: solution of the characteristic initial value problem", Class. Quantum Grav. **21** (2004) 5623-5654; arXiv:gr-qc/0410047.

6. G.A.Alekseev and J.B.Griffiths, ``Solving the characteristic initial value problem for colliding plane gravitational and electromagnetic waves", Phys.Rev.Lett **87**, 221101 (2001); arXiv:gr-qc/0105029.

7. G.A.Alekseev, ``Gravitational solitons and monodromy transform approach to solution of integrable reductions of Einstein equations", Physica D **152**, 97-103 (2001); arXiv:gr-qc/0001012.

8. G.A.Alekseev, ``New integral equation form of integrable reductions of Einstein equations'', Theoretical and Mathematical Physics, **129(**2), 184 -- 206, (2001); Translated from Teoreticheskaya i Matematicheskaya Fizika, **129**, 1466, (2001); arXiv:gr-qc/0105111.

9. G.A.Alekseev, ``Monodromy transform approach to solution of the Ernst equations in General Relativity", Annalen der Physik (Leipzig), **9**, Spec.Issue, p. SI-17 -- SI-20 (2000); arXiv:gr-qc/9912109.

10. G.A.Alekseev, ``Monodromy transform approach to solution of some field equations in General Relativity and string theory", Proceedings of the workshop "Nonlinearity, Integrability and all that: Twenty years after NEEDS'79" (Gallipoli, Lecce, Italy, 1-10 Jul 1999), p. 12 -- 18, World Scientific, Singapore (2000); arXiv:gr-qc/9911045.

11. G.A.Alekseev and J.B.Griffiths, ``Infinitenfinite hierarchies of exact solutions of the Einstein and Einstein-Maxwell equations for interacting waves and inhomogeneous cosmologies", Phys.Rev.Lett. **84**, p. 5247-5250, (2000); arXiv:gr-qc/0004034.

12. G.A.Alekseev and J.B.Griffiths, ``Gravitational waves with distinct wave fronts", Class.Quant.Grav. **14**, p.2869-2880 (1997); arXiv:gr-qc/9707049.

13. G.A.Alekseev and J.B.Griffiths, ``Exact solutions for gravitational waves with cylindrical, spherical and toroidal wavefronts", Class.Quant.Grav. **13**, p.2191-2209 (1997).

14. G.A.Alekseev and J.B.Griffiths, ``Gravitational waves with spherical wavefronts", Class.Quant.Grav. **13**, p.L13-L18 (1996).

15. G.A.Alekseev and A.A.Garcia ``Schwarzschild black hole immersed in a homogeneous electromagnetic field", Phys.Rev.**D53**, issue 04, p. 1853-1867 (1996).

16. G.A.Alekseev, ``Explicit form of the extended family of electrovacuum solutions with arbitrary number of parameters", Abstracts of Contributed Papers, 13th International Conference on General Relativity and gravitation, edited by Pedro W. Lamberty, Omar E.Ortiz (Huerta Grande, Cordoba, Argentina), p. 3 - 4 (1992).

17. G.A.Alekseev, ``Isomonodromy deformations and integrability of electrovacuum Einstein - Maxwell field equations with isometries", IV International Workshop "Solitons and Applications" (Dubna, 1989), Contributed Papers, World Scientific, Singapore (1989), p. 174 – 179.

18. G.A.Alekseev, ``Exact solutions for gravitational and electromagnetic fields from moving sources", (Transactions of the Institute of Physics of the Estonian Acad. Sci. **65,** p. 79 - 88, (1989).

19. G. A. Alekseev, ``Exact solutions in General Relativity'', Proceedings of Steklov Institute of Mathematics, **3**, 215 - 262 (1988).

20. G.A.Alekseev, ``Twelve - parametric electrovacuum two - soliton solution -- the external field of two interacting Kerr - Newman sources", 11th International Conference on General Relativity and gravitation (Stockholm, Sweeden, 1986), Abstracts of Contributed.Papers, **1**, p. 227 (1986).

21. G. A. Alekseev, "Inverse Scattering method and the singular integral equations for interacting massless fields", Sov. Phys. Dokl. **30**, 565 -- 568 (1985).

22. G.A.Alekseev, ``Soliton configurations of interacting massless fields'', Sov. Phys. Dokl. **28**, 133 -- 135 (1983).

23. G.A.Alekseev, ``Method for generating exact solutions of non-soliton type for electrovacuum gravitational fields'', Soviet Phys. Dokl. **28**, 17 -- 19 (1983).

24. G.A.Alekseev, ``On the soliton solutions of Einstein equations for vacuum'', Soviet Phys. Dokl. **26**, 158 (1981).

25. G.A.Alekseev, ``N-soliton solutions of Einstein – Maxwell equations'', JETP Lett. **32**, 277 -- 279 (1980).

26. G.A.Alekseev, ``Soliton Configurations of Einstein -- Maxwell fields", 9th International conference on General Relativity and gravitation, (Jena, 1980), Abstracts of Contr.Pap. **1**, pp. 2 – 3 (1980).

27. G.A. Alekseev and V.A. Belinski, "Static gravitational solitons'', Soviet Phys. JETP **51**, 655 (1980).

28. N.R.Sibgatullin and G.A. Alekseev, "Wave fields outside a collapsing charged star'', Sov. Phys. JETP **40**, No. 4, 613 -- 620 (1974).

29. Alekseev G A and Sibgatullin N R, ``Effect of the mutual conversion of electromagnetic and gravitational waves in strong external electromagnetic fields and wave propagation in the field of a charged 'black hole' '', Prikladnaia Matematika i Mekhanika **38**, No.6, 1122-1129 (1974).