

Curriculum Vitae

BIČÁK Jiří, Prof., RNDr., DrSc.

Born January 7, 1942 in Prague

Theoretical and mathematical physics
general relativity, relativistic astrophysics and cosmology



Educational and professional preparation:

1959, graduate, secondary school at Prague-Vinohrady;
1959-1964, Faculty of Mathematics and Physics, Charles University in Prague, specialization theoretical physics; 1968, RNDr. and CSc. (equivalent of PhD); 1982, Associate Professor; 1983, DrSc (analogue of DSc.); 1991, Professor of theoretical physics

Employment and academic positions:

1964-present, Department (since 1999 Institute) of Theoretical Physics,
Faculty of Mathematics and Physics, Charles University, Prague
1986-2003, Head of the Department, Director of the Institute

Research stays, lectures, organising workshops, etc. at institutes, universities, conferences in Europe, USA, Canada, Israel, Australia, Japan, India and South Africa. Long-term research stays (at least 2 months): 1971, California Institute of Technology (invited to a post-doctoral position, allowed to stay only 6 months by Czechoslovak authorities); 1976-1985, Moscow University; 1979, Institute of Astronomy, University of Cambridge, U.K. (regular collaboration yearly since 1990); 1982, Max-Planck Institute for Physics and Astrophysics, Garching, Germany (regular collaboration yearly until 1995); 1994, 1996, University of Utah, U.S.A; Albert-Einstein-Institute (Max-Planck Institute for Gravitational Physics), Golm/Potsdam, Germany (regular collaboration yearly since 1995).

Until 1990, all stays and lectures abroad (except for USSR and associated countries with which various 'official agreements' of collaboration were available) were "invited".

Three selected invited lectures at international conferences until 1990:

- Lectures on perturbations of gravitational collapse, E. Majorana Centre, Erice, Italy, 1974
- Plenary lecture, "Einstein's Prague ideas on gravitation: history and the present",
The 6th General Conference of the European Physical Society, Prague, 1984
- Invited review, "Exact Radiative Spacetimes", 5th M. Grossmann Meeting in General Relativity, Perth, Australia, 1988

The list of invited lectures abroad during last ten years is given on pages 6-8.

Research—summary:

Research work in: general relativity, gravitational radiation theory, the asymptotic structure of spacetimes, black hole physics, exact solutions of Einstein's field equations and their physical interpretation, conservation laws, cosmological models and perturbation theory, canonical formalism, selected problems of relativistic astrophysics.

In a lesser degree: non-linear electrodynamics, relativistic thermodynamics, history of physics in the 20th century.

Over 120 original papers published in professional journals and volumes, 2 books (see the list of publications). Invited contributions to Festschrifts and Encyclopedia published abroad.

Over 1300 citations, including citations in more than 33 monographs, textbooks and other volumes (e.g., by S.Chandrasekhar, by K. S. Thorne *et al*, by V. Frolov & I. D. Novikov, by H. Stephani *et al*, in the volume “300 years of gravitation”, etc.).

In 1986, I started to organize the Prague “Relativity Seminar” at the Department of Theoretical Physics. It included first generations of my students (e.g., L. Dvořák, P. Hadrava, Z. Stuchlík, V. Karas), followed by J. Podolský, O. Semerák, P. Krtouš, T. Kopf, T. Ledvinka, later A. Pravdová, V. Pravda, M. Žofka, and others. At present, students of the students also participate and, occasionally, Czech relativists outside Prague and visitors from abroad. The organization is now shared by O. Semerák and me. The participants of the grant “Relativistic Physics and Astrophysics” of the Grant Agency of the Czech Republic (of which I was a principal investigator since 1993) meet regularly at the Relativity Seminar.

Main recent scientific interactions: colleagues (my former or present students) in the Czech Republic; abroad, German scientists (in particular in Garching, Potsdam/Golm, Jena), and Profs. D. Lynden-Bell (Cambridge), J. Katz (Jerusalem), and P. Hájíček (Berne).

Teaching—summary:

From the late 60's, lectures on most parts of theoretical physics. Main focus on the lecture course “Relativistic physics and astrophysics” (4/2 hours during both semesters), newly introduced in 1972, given then yearly and updated continuously. The course has been taken by students of theoretical physics (including my direct research students and later collaborators, or, for example, some theoretical physicists and astrophysicists established now abroad like, e.g., P. Hořava, I. Hubený, C. Klimčík, L. Motl, L. Pichl, V. Severa, and others), by students of astronomy and astrophysics and, occasionally, by students of nuclear physics and mathematics. In 1985, I introduced a new lecture course on “Geometrical Methods in Physics” (3/2 hours during one semester). At present my colleagues also participate in teaching in both of these courses.

I supervised 25 diploma theses and 18 PhD theses.

Popularization and promotion of science:

A number of popular articles on relativity, cosmology, relativistic astrophysics, on life and work of A. Einstein, etc.; translations (into Czech), organisation and edition of several popular science books, writing special forwards/afterwards (for a partial list, see the list of publications, parts C, D, E). Frequent lectures at universities, schools, various institutions, meetings etc. in the Czech Republic for last 40 years. An example: 9 talks outside Faculty of Mathematics and Physics, Prague, during the first 8 months of 2005. Occasionally, science popularization in radio, TV, and in interviews in daily press (starting from 1990).

Awards (selected):

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| 1973 | Copernicus Medal, Czechoslovak Astronomical Society |
| 1977 | Honourable mention, Gravity Research Foundation, Massachusetts (USA), for the work on perturbations of black holes |
| 1978, 1980 | Awards for scientific papers (in general relativity and relativistic astrophysics), from the Czech Literary Foundation |
| 1980 | Elected to the Governing Committee, International Society for General Relativity and Gravitation (for the period 1980-1989) |
| 1981 | Bolzano Medal, Czechoslovak Mathematical Society |
| 1987 | Medal of the Physics Section, Union of Czechoslovak Mathematicians and Physicists, for research and teaching in theoretical physics |
| 1991 | Award for promotion and popularization of science, Czechoslov. Acad. Sci (as a member of a collective) |
| 1994 | The Learned Society of the Czech Republic (replacing previous Board of Academicians)--selected as a founding member |
| 1995 | Elected to the Governing Committee, International Society for General Relativity and Gravitation (for the period 1995-2004) |
| 2000 | Sackler Distinguished Visiting Astronomer, University of Cambridge |
| 2002 | Gravitation: Following the Prague Inspiration - A Volume in Celebration of the 60th Birthday of Jiří Bičák, eds. O. Semerák, J. Podolský, M. Žofka, World Scientific, New Jersey-London-Singapore, pp XXI + 323. Reviews in: Classical and Quantum Gravity 20 , 4503 (2003), by J.B.Griffiths; General Relativity and Gravitation 36 , 1507 (2004), by M.A. Abramowicz |
| 2005 | Doctor honoris causa (dr.h.c.) from the Silesian University, Opava |
| 2006 | Humboldt Prize from Alexander von Humboldt Foundation, Germany (for lifetime achievements in research and teaching) |
| 2007 | Asteroid (55844) 1996 RN ₂ =(55844) Bicak-Theoretical Physicist |

Membership in selected domestic scientific bodies:

1986-present	Scientific Council, Faculty of Mathematics and Physics, Charles University, Prague
1989 (Dec.)-1991	Chairman, Academic Senate, Faculty of Mathematics and Physics, Charles University (as a consequence of elections in which all the Faculty participated)
1990-1993	Scientific Council, Institute of Physics, Czechosl. Academy of Sci.
1991-1994	Scientific Council, Institute of Astronomy, Czechosl. Academy of Sci.
1992-present	Scientific Council, Faculty of Philosophy and the Natural Sciences, Silesian University, Opava
1988-1991	Scientific Collegium of Physics of Czechosl. Acad. Sci., Prague
1979-1982	Prague Committee of Physical Section, Union of Czechoslovak Mathematicians and Physicists (elected)
1995-2001	National Astronomical Committee (elected, 2 periods)
1990-2000	Council for Promotion of Science, Academy of Sci. Czech Republic
1968-1994	Editorial Board, Czechoslovak Journal of Physics A

Membership and positions in selected international organizations and societies:

1977	International Society for General Relativity and Gravitation; in the periods 1980-1989 and 1995-2004 elected member of the Governing Committee
1979	Member, International Astronomical Union
1988	Member, European Physical Society
1988	Fellow, British Institute of Physics (elected)
1990-1996	Commission for Astrophysics of the International Union for Pure and Applied Physics, IUPAP (elected, 2 periods)
1997	Member, American Physical Society
1997	Academia Scientiarum et Artium Europaea, Salzburg-Vienna (elected regular member)
1997	Fellow, Royal Astronomical Society, London (elected)
2001	Academia Europaea, London (elected regular member)
2001	Council of "Gravitational Physics" Joint Section of the European Physical Society and European Astronomical Society (elected)

2002	European Academy of Sciences, Brussels (elected regular member); 2003-present, member of the Editorial Board, 2006- member of the Scientific Committee
2003	Académie Européenne des Science, des Art et des Letters, Paris (elected corresponding member) Académie Européenne des Science, des Art et des Letters, Paris (elected corresponding member)
1980-1989	Editorial Board, General Relativity and Gravitation
1985-1988	Editorial Board, European Journal of Physics
2001-present	Editorial Board, Central European Journal of Physics

Membership in scientific committees:

Member of the Scientific Organizing Committees of a number of international conferences and meetings in the Czech Republic (A. Einstein centenary conference 1979, 3 conferences on Mathematical Physics (1975,1982,1989), E. Mach centenary conference 1988, “Logical Foundations of Mathematics, Computer Science and Physics--Kurt Goedel's Legacy” 1996, Meeting of the European Astronomical Society, 1998, etc.) and abroad (more recently, e.g., Programme Committee of the 5th M. Grossmann Meeting, Jerusalem 1996, Workshop on Quantum Gravity, Warsaw 1997, International Conference on General Relativity and Gravitation--GR15, Pune, 1998, Journées Relativistes, Weimar, 2000, long-term member of the International Advisory Committee for Marcel Grossmann Meetings, the organizer of the Workshop on helically symmetric systems, Albert Einstein Institute, Potsdam, January 2007).

Member of other committees abroad (e.g., Review Committee for the journal General Relativity and Gravitation, 2004), PhD and habilitation Examination Committees (in Germany, U.K., France, Canada, India) and numerous committees in the Czech Republic as, e.g., after 1989, the chair of the commissions for nominations of specific university professors, a long-standing head (from 1993) of the Board for Graduate Studies of Theoretical Physics and Astrophysics, a long-standing head (from 1986) of the “State Examinations Commission” in Theoretical Physics at the Faculty of Mathematics and Physics, Charles University, etc.

Refereeing work:

Regular refereeing of papers, theses, grant proposals, etc. for last 40 years in the Czech Republic. Approximately 20 papers per year for European Journal of Physics (as a member of editorial board in 1985-1988), from 1980 until 1990, refereeing of a number of papers for General Relativity and Gravitation (as a member of the editorial board in 1980-1989). From 1990 until present regularly per year about 5 papers for Classical and Quantum Gravity and 5 papers for Physical Review D.

Less frequent refereeing work also for Phys. Rev. Letters, Journal of Mathematical Physics, Communications of Mathematical Physics, Proc. Roy. Soc. (London), Journal of Geometry and Physics, Annalen der Physik, Annals of European Academy of Sciences, Astrophysical Journal, Astrophysical Journal Letters, Astronomische Nachrichten,

Europhysics Letters, General Relativity and Gravitation, Czechoslovak Journal of Physics A and B, Bulletin of the Astronomical Inst. of Czechoslovakia (until its fusion with Astronomy & Astrophysics), Acta Physica Polonica, Acta Physica Slovaca, Acta Universitatis Carolinae, Astronomy and Astrophysics, Astrophysics and Space Physics, Journal of Cosmology and Astroparticle Physics, Central European Journal of Physics, and (once) for Solar Physics.

Invited lectures at international meetings and institutions abroad (last 10 years):

The topics of the lectures listed below can be divided into the following themes:

- radiative spacetimes; either broad reviews on general features (asymptotics, existence, etc.), including discussions of explicitly known classes of radiative spacetimes, or talks devoted entirely to a specific class of radiative solutions, e.g., on boost-rotation symmetric radiative spacetimes with accelerated objects, on cylindrical waves and asymptotic structure in 2+1 dimensions, on colliding waves in cosmology, on Robinson-Trautman spacetimes with a positive cosmological constant, on radiative fields in de Sitter universe, etc.;
- relativistic disks as sources of stationary spacetimes; in particular physical disk sources of the Kerr metrics, disks with external fields associated with galactic potentials, etc.;
- gravitomagnetic effects; either broad reviews of our work, or talks on specific problems like collapsing, slowly rotating shells in asymptotically flat spacetimes, or matter shells expanding and slowly rotating in a Friedmann universe;
- cosmological perturbation theory, choice of 'appropriate' gauges, integral constraint vectors and conservation laws with respect to a background spacetime;
- perturbations of black holes; stationary fields around black holes, Meissner effect of field expulsion from nearly extreme black holes; motion of black holes in 'external' fields;
- a few lectures on Einstein's days and works in Prague, in particular on his ideas on gravitation, and on how these are viewed from the present-day perspective.

A. International meetings

2007

Workshop on the helically symmetric systems, Albert Einstein Institute, Potsdam

2005

Einstein-Woche, plenary talk at the International Conference on General Relativity, organized by Friedrich-Schiller University, Jena, Germany

International conference on Relativistic Astrophysics in honour of Prof. Donald Lynden-Bell, FRS. , organized by the Royal Astronomical Society, London, U.K.

2004

The 17th International conference on General Relativity and Gravitation – GR 17, 4 selected oral contributions, and chairman of a plenary session, Dublin, Ireland
“Festvortrag” at the Meeting to honour Prof. D. Kramer, Faculty of Physics, Friedrich-Schiller University, Jena, Germany

Talk at the International Relativity Mini-workshop at the Institute of Theoretical Physics, Charles University, Prague, Czech Republic

2002

Plenary lecture at the 10th Hellenic Relativity Conference on Recent Developments in Gravity, Kalithea/Chalkidiki, Greece

2001 Chairman of the workshop A1, selected oral contribution, and chairman of a plenary session at the 16th International Conference on General Relativity and Gravitation – GR16, Durban, South Africa

Lecture at the 1st conference of Gravitational Physics Section of the European Physical Society and European Astronomical Society, Munich, September 2001

2000

Plenary lecture at the 14th SIGRAV Conference on General Relativity and Gravitational Physics, International conference organized by the Italian Society on General Relativity, Genoa, Italy

Plenary lecture, the chairman of the workshop on Physics of Black Holes, and ‘evening’ lecture at ICGC-2000, The Indian international conference on Relativity and Cosmology, Karaghpur, India

1999

Plenary lecture at the International European Conference on Gravitation, Journées Relativistes 99, Weimar, Germany

Invited lecture at the Symposium on Relativistic Astrophysics, Pescara, Italy

International conference in honour of Prof. J. Katz, Hebrew University, Jerusalem, Israel

1998

Chairman of the workshop on Relativistic Astrophysics, chairman of a plenary session, and 3 oral contributions at the Joint European and National Astronomical Societies Meeting (JENAM), Prague

1997

The 8th Marcel Grossmann Meeting on General Relativity, MG8, 4 selected oral contributions, Jerusalem, Israel

Invited lecture at the Czech-French conference on Philosophy of Science, Prague

1996

Invited Lecture and the chairman of a session at the 19th Jena Relativity conference, Tambach – Dietharz, Germany

Invited talk at Karel Kuchař Fest, University of Utah, Salt Lake City, USA

Chairman of a session and of a discussion at the International Kurt Goedel’s conference, Brno, Czech Republic

1995

The 14th International conference on General Relativity and Gravitation-GR-14, Florence, Italy, 3 selected oral contributions

“Festvortrag” at the Meeting to honour Prof. H. Stephani, Faculty of Physics, Friedrich-Schiller University, Jena, Germany
Invited lectures at Les Houches School on “Relativistic Gravitation and Gravitational Radiation”, Les Houches, France

B. Universities and institutes abroad

2005

Colloquium and Seminar at the Faculty of Physics, Tuebingen University, Germany
Seminar at the Institute of Theoretical Physics, University of Berne, Switzerland
Colloquium and Seminar at the Faculty of Physics, Comenius University, Bratislava, Slovakia

2004

Seminar at the Mathematical Institute, University of Potsdam, Germany
Seminar at the Institute of Astronomy, University of Cambridge, U.K.
Two lectures at the Relativity Seminar, Institute of Theoretical Physics, Friedrich-Schiller University, Jena, Germany

2002

Talk at the Cosmology Seminar, Max-Planck Institute for Astrophysics, Garching, Germany
Talk at the Mathematical Relativity seminar, Albert Einstein Institute (Max-Planck Institute for Gravitational Physics), Golm, Germany
Talk at the Seminar on Relativistic Astrophysics and Cosmology, Institute d’Astrophysique, Meudon, France

2001

Talk at the Joint Relativity Seminar, University of Portsmouth and University Southampton, Portsmouth, U.K.
Talk at the Seminar of the Institute Astronomy, University of Cambridge, U.K.

2000

Talks (seminars) in India during my stay there in January: seminar at Jadavpur University, Calcutta; 2 seminars at the Indian Institute of Astrophysics, Bangalore; colloquium and seminar at IUCAA, Pune; seminar at Tata Institute, Bombay
Lecture at Relativity Seminar, Queen Mary and Westphal College, University of London, U.K.
Seminar at the Istituto Nazionale di Fisica Nucleare, Florence, Italy

1999

Seminar at the Institute of Theoretical Physics, University of Berne, Switzerland

1998

Seminar at DARC (Department of Relativistic Astrophysics and Cosmology), Observatoire de Paris, Meudon, France
Colloquium at the Institute of Theoretical Physics, Friedrich-Schiller University, Jena, Germany

1997

Lecture at the Erwin Schroedinger Institute, Vienna
Seminar at the Racah Institute of Physics, Hebrew University, Jerusalem, Israel
Seminar at the Institute of Astronomy, University of Cambridge, U.K.

Seminar at the Albert-Einstein Institute, Potsdam

1996

Series of lectures during stay in U.S.A.: at the Department of Physics, University of Utah, Salt Lake City; at the Department of Physics, at the Department of Physics, University of Pittsburgh, Pittsburgh; at the Centre of Geometry and Physics, Penn State University, State College; at the Department of Physics, University of Maryland, College Park

1995

Talk at the mini-workshop on cosmology, Institute of Astronomy, University of Cambridge
Seminar at the Department of Mathematics, University of Loughborough, Loughborough, U.K.

Selected publications:

J. Bičák: Gravitational radiation from uniformly accelerated particles in general relativity, Proc. Roy. Soc. A (London) **302** 201-224 (1968)

J. Bičák: Gravitational collapse with charge and small asymmetries, Gen. Rel. Grav. **3** 331-349 (1972)

J. Bičák, Z. Stuchlík: The fall of the shell of dust onto a rotating black hole, Mon. Not. Roy. Astron. Soc. **175** 381-393 (1976)

J. Bičák: Einstein a Praha (Einstein and Prague – in Czech, parts in German), Union of Czechoslovak Mathematicians and Physicists, Prometheus, Prague 1979, pp 64

J. Bičák, L. Dvořák: Electromagnetic fields around black holes III. General solutions..., Phys. Rev. D, **22** 2933-2940 (1980)

J. Bičák, V. Janiš: Magnetic fluxes across black holes, Mon. Not. Roy. Astron. Soc. **212**, 899-915 (1985)

J. Bičák, V. N. Rudenko: Gravitacionnyje vol'ny v obschej teorii otnositel'nosti i metody ich detekcii (Gravitational waves in general relativity and the methods of their detection [in Russian]), Moscow University Press, Moscow 1987, pp 270; (pedagogical version in Czech)

J. Bičák, B. G. Schmidt: Asymptotically flat radiative spacetimes with boost-rotation symmetry: the general structure, Phys. Rev. D **40** 1827-1853 (1989)

J. Bičák, O. Semerák, P. Hadrava: Collimation effects of the Kerr field, Mon. Not. Roy. Astron. Soc. **263** 545-559 (1993)

J. Bičák, T. Ledvinka: Relativistic disks as sources of the Kerr metric, Phys. Rev. Lett. **71** 1669-1672 (1993)

A. Ashtekar, J. Bičák, B. G. Schmidt: Asymptotic structure of symmetry-reduced general relativity, Phys. Rev. D **55** 669-686 (1997)

J. Bičák, K. Kuchař: Null dust in canonical gravity, Phys. Rev. D **56**, 4878-4895 (1997)

J. Katz, J. Bičák, D. Lynden-Bell: Relativistic conservation laws and integral constraints for large cosmological perturbations, Phys. Rev. D **55** 5957-5969 (1997)

J. Bičák: Selected solutions of Einstein's field equations: their role in general relativity and astrophysics, in Einstein's field equations and their physical implications (Selected essays in honour of Jürgen Ehlers), ed. B. G. Schmidt, Lecture Notes Phys. **540**, Springer-Verlag, Berlin - Heidelberg 2000, pp 1-126

- J. Bičák, T. Ledvinka: Electromagnetic fields around black holes and Meissner effect, *Nuovo Cim.* **B115** 739-750 (2000)
- J. Bičák and P. Hájíček: Canonical theory of spherically symmetric spacetimes with cross-streaming null dusts, *Phys. Rev. D* **68** 104016 (15 pages) (2003)
- P. Krtouš, J. Podolský and J. Bičák: Gravitational and electromagnetic fields near a de Sitter-like infinity, *Phys. Rev. Lett.* **91** 061101 (4 pages) (2003)
- J. Bičák, D. Lynden-Bell, J. Katz: Do rotations beyond the cosmological horizon affect the local inertial frame? *Phys. Rev. D* **69** 064011 (2004)
- J. Bičák, P. Krtouš: Fields of accelerated sources: Born in de Sitter, *J. Math. Phys.* **46** (2005), 102504 (60 pages)
- J. Bičák, D. Kubiznák: Ultrarelativistic sources in nonlinear electrodynamics, *Physics Letters* **B636**, 142-146 (2006)

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