

## Curriculum Vitae

### Sergey Ivanovich Blinnikov

Home address: 115563, Moscow, Russia,  
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Date of birth: 25 November 1948  
Place of birth: Okha, Sakhalin Island, Russia, USSR  
Marital status: married, wife Blinnikova Elena  
Nationality: Russian  
Sex: male

#### Current permanent position

Head Scientist,  
Laboratory for Astrophysics and Thermonuclear Fusion of the  
Institute for Theoretical and Experimental Physics,  
117218, Moscow, Russia.

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#### Education

1966-1972 Student of Moscow State University,  
Department of Physics and Sternberg Astronomical Institute.  
1972-1975 Graduate student of Moscow State University,  
Department of Physics, Sternberg Astronomical Institute,  
and Keldysh Institute of Applied Mathematics.  
Supervisors: Ya.B.Zeldovich and G.S.Bisnovatyi-Kogan

#### The PhD thesis

“The equilibrium and stability of rotating stars”  
defended in 1975 at Moscow State University — Sternberg Institute.

#### The 2nd dissertation — Dr.Sci.

“Non-stationary radiative and hydrodynamic processes in supernovae”  
defended in 2000 at Moscow State University — Sternberg Institute.

#### Employment

1975-1979 Junior sci.staff member at the Laboratory for  
Relativistic Astrophysics,  
Space Research Institute, Moscow, USSR,  
1979-1989 Senior sci.staff member,  
ITEP, Moscow, 117259, Russia  
1989 – now Head scientist,  
ITEP, Moscow, 117218, Russia

1990/04-06, 1991/11-1992/09, 1994/03-06,  
1995/10-12, 1996/03, 1997/10, 1998/08,  
1999/06-08, 2000/07-08, 2001/09-10, 2002/08-09,  
2003/09-10, 2004/05-06, 2005/03-11, 2006/06-07,  
2007/08-09, 2008/08 Visiting Scientist at Max-Planck Institute for Astrophysics  
Garching, FRG

1993/03-04	Visiting Scientist at Copenhagen University Observatory Copenhagen, Denmark
1993/09-11, 1995/03-04, 1999/03-04, 2001/03-05, 2004/07-09, 2007/05-06	Visiting Scientist at Lick Observatory, University of California Santa Cruz, California, USA
1996/04, 1998/05, 1998/12, 2001/11-12	Visiting Scientist at Stockholm University Observatory Saltsjöbaden, Sweden
1996/09-11	Visiting professor at NAO Mitaka, Tokyo, Japan
1997/02 and 06-07, 2006/09-11, 2007/10-12	Visiting professor at Tokyo University Tokyo, Japan
1999/12 through 2000/05 and 2003/02 through 2003/05	Visiting professor at Osaka University Osaka, Japan

*Also partly employed in 1993-2006 as senior scientist by*

Sternberg Astronomical Institute, Moscow State University, 119899, Moscow, Russia

*Also partly employed in 1999-2007 as professor by*

Moscow Physics Technical Institute, Moscow, Russia

## **Research**

Stellar rotation: designed two different self-consistent methods for arbitrary fast rotation, developed a static criterion of stability.

Accretion onto compact objects: developed the first model of accretion disk corona.

Collapse and explosion of stars: studied heating effects for kinetics of neutronization during collapse, spherization of supernova remnants in uniform medium, developed first GRB scenario in merging neutron star binary.

Neutrino properties: found reliable upper limits on neutrino magnetic moments from evolution of white dwarf stars.

Astrophysical effects of hypothetical particles and interactions: developed first cosmological models of mirror matter as dark matter, models of GRBs as mirror matter stars.

Non-equilibrium radiative transfer: algorithms for numerical computations of supernova light curves of all types, shock-breakout effects, averaging spectral line opacity in expanding medium.

Theory of flames: non-linear numerical models for Landau instability and fractalization of flames.

X-ray emission of supernova remnants: models of non-equilibrium time-dependent ionization consistently coupled to hydrodynamics.

## **Research plans**

Investigation of non-equilibrium radiative and hydrodynamic processes in expanding supernova envelopes, in young supernova remnants, the modeling of type Ia supernovae with the goal to understand the nature of Pskovskii-Phillips relation for their peak luminosity - decline rate. The development of an ultra-relativistic hydrocode coupled to radiative transfer for modeling strong SN shocks, cosmological gamma-ray bursts and their afterglows. Thermal runaway and flame acceleration in degenerate stellar cores, neutrino transport in stellar collapse, general relativistic hydrodynamics in SNe and GRBs.