

Warsaw, 3 May 2023

Curriculum Vitae

Bozena Czerny

Personal:

Born: 15 October 1952, Klodzko, Poland

Maiden name: Muchotrzeb

Children: 1 (Pawel, born 7 June 1988)

Citizen of Poland

Education:

1969 - State High School No. 48, Warsaw

1974 - M.S. in theoretical physics, Department of Physics, University of Warsaw

1984 - Ph.D. in astrophysics, N. Copernicus Astronomical Center, Polish Academy of Sciences, Warsaw

1989 - Senior D. in astrophysics, Department of Mathematics, Physics and Chemistry, University of Wrocław

1996 - awarded the title of full professor by the President of Poland

Positions:

1974 - 1977 graduate student, Department of Physics, University of Warsaw

1977 - 1978 research assistant, Copernicus Astronomical Center, Warsaw

1978 - 1978 research assistant, publishing house "Wiedza Powszechna", Warsaw

1978 - 1984 research assistant and senior research assistant, Copernicus Astronomical Center

1984 - 1990 research associate, Copernicus Astronomical Center

1990 - 1996 associate professor (in Polish: docent), Copernicus Astronomical Center

1996 - 2017 professor, Copernicus Astronomical Center

2015 – professor, Center for Theoretical Physics

PI in large research grants:

1992 -- ``Anisotropy of dust distribution in active galactic nuclei" KBN 2-1188-91-01

1992 - ``Iron line as a test of accretion mechanism", KBN 2-1187-91-01

1993 - 1995 ``Reprocessing of the primary emission in active galactic nuclei", KBN 2-P304 010 04

1996 - 1998 ``Are intrinsic activity mechanisms in Seyfert 1 and Seyfert 2 galaxies the same?", KBN 2-P030 D 004 10

1999 - 2001 ``Broad band study of spectra and variability of active galactic nuclei", KBN 2-P03 D 018 16

2002 - 2005, "Two-phase accretion onto black holes in active galactic nuclei", KBN 2-P03 D 003 22

2005 - 2008, "Winds and outflows from accreting black holes", KBN 1-P03 D 008 29

2009 – 2012, "Evolution of active galactic nuclei", NN 203 380136

2013-2015, ""Quasars as tracers of the dark energy", FNP/Mistrz/3/2012

2016 -2019, "Quasar main sequence", NCN 2015/17/B/ST9/03436

2018 – 2023, „Constraints on the dark energy properties from observations of active galactic nuclei”, NCN/2017/26/A/ST9/00756

2022 – 2024, „Weather effects in using disk continuum time delays in active galactic nuclei to measure the expansion rate of the Universe”, NCN/2021/43/I/ST9/01352

2021 – 2027 , ERC Synergy grant „UniverScale – Sub-percent calibration of the extragalactic distance scale in the era of big surveys”,

Teaching experience:

1991 - advisor of Ph.D. Thesis, Adam Dobrzycki, ``Quasar emission lines"

1991 - advisor of Ph.D. Thesis, Aneta Siemiginowska, "Geometrically thin accretion disks in active galactic nuclei: theory and observations"

1993 - advisor of M.S. thesis, Joanna Cukierska, "The Infrared Emission of Active Galactic Nuclei"

1994 - advisor of M.S. thesis, Andrzej Kurpiewski, "Accretion disk coronae in active galactic nuclei"

1995 - advisor of M.S. thesis, Agata Rozanska, "Vertical structure of accretion disks irradiated by hard X-ray component,"

1995 - student course, "Accretion processes in astrophysics", Warsaw University Observatory

1998 - advisor of M.S. thesis, Agnieszka Janiuk, "Accretion disk with a corona as a model of X-ray activity of Nova Muscae 1991"

1998 - advisor of M.S. thesis, Agnieszka Szrom, "Model of accretion onto neutron stars: theory and comparison with observations"

1998 - graduate student course, "Accretion processes in astrophysics", Copernicus Astronomical Center

1999 - advisor of M.S. thesis, Marek Nikolajuk, "Modelling of the quasar continua,"

1999 - advisor of Ph.D. Thesis, Joanna Kuraszkiewicz, "Exploring the central power house of quasars via emission lines"

2000 - advisor of Ph.D. Thesis, Agata Rozanska, "Coexistence of the cold and the hot plasma in the vicinity of the black hole"

2001 - advisor of M.S. thesis, Michal Piasecki, "X-ray variability in active galactic nuclei"

2002 - graduate student course, "Accretion processes in astrophysics", Copernicus Astronomical Center

2003 - advisor of Ph.D. Thesis, Agnieszka Janiuk, "Disc accretion onto a black hole"

2004 - student course, "Accretion processes in astrophysics", Poznan University

2004 - advisor of M.S. thesis, Monika Moscibrodzka, "Accretion onto Sgr A*"

2004 - advisor of Ph.D. Thesis, Marek Nikolajuk, "Global parameters of active galactic nuclei"

2007 - advisor of Ph.D. Thesis, Pawel Lachowicz, "Selected Aspects of Periodic and Quasi-Periodic Variability of Accreting Black Holes"

2008 - advisor of Ph.D. Thesis, Monika Moscibrodzka, "The dynamics and radiation spectra of low angular momentum accretion flow onto a black hole,"

2013 - advisor of PhD Thesis, Krzysztof Hryniewicz, "Weak Line Quasars"

2021 – advisor of PhD Thesis, Swayamtrupta Pands, "Physical Conditions in the Broad-line

Regions of Active Galaxies”

2022 – co-advisor of PhD Thesis, Marzena Śniegowska, “Variability and evolution of active galactic nuclei”

Research interests

My early interests were focused on general relativity, particularly the description of rotating bodies and properties of the Kerr metric representing a rotating black hole. In 1978 I started to work under the supervision of Bohdan Paczynski on the theory of accretion disks. In my Ph. D. thesis (supervisor: Jerzy S. Stodolkiewicz) I showed that the accretion in the innermost region of the disk is transonic and the character of accretion (i.e. its stability) strongly depends on viscosity of accreting gas. In 1984 - 1988 I concentrated on the properties of galactic and extragalactic X-ray sources. I collaborated with a number of scientists from Harvard/Smithsonian Center for Astrophysics and the University of Leicester . My contribution to these papers was to provide theoretical models for the observational data and to prepare non-standard analysis of the X-ray data. Spectral models included the presence of the hot corona in AGN accretion disks and the emission from the boundary layer in case of accretion onto neutron star. X-ray timing analysis included the fractal approach. In collaboration with Marek Abramowicz, Jan Piotr Lasota i Ewa Szuszkiewicz we developed a model of advection dominated optically thick flow. Since 1989 I constrained myself to active galactic nuclei and started more systematic multi-wavelength approach to study the basic physical components necessary to construct a universal model of the phenomenon of accretion onto a supermassive black hole, and to support the idea that such a model explains the nature of AGN activity. The published papers included both broad band study of spectra as well as spectral features like iron line and Lyman edge. I regularly collaborated at that time with Suzy Collin and her group (Meudon, France) on the application of the advanced spectral models based on accurate solution of radiative transfer, with Vladimir Karas (Prague, Czech Republic) on General Relativity effects in accretion flow, and occasionally with many other scientists from Europe, US and Asia . My recent new ideas include the explanation of the formation mechanism of the broad emission lines that are signatures of quasars (together with my current PhD student, Krzysztof Hryniewicz). Now I concentrate on quasar application to cosmology, more specifically, to measuring the properties of the dark energy/expansion rate of the Universe. I lead the review article on “Astronomical Distance Determination in the Space Age. Secondary Distance Indicators “ (Czerny et al., 2018, Space Science Reviews, 214, 32) where new cosmological tools were also discussed. Overall, I am the author/co-author of over 300 papers which were quoted above 8200 times in the literature, and my Hirsch index is 47 according to ADS data base.

List of publications:

Current list of publications and citations is available in the internet page:

https://ui.adsabs.harvard.edu/search/p_=0&q=%20author%3A%22Czerny%2C%20B.%22&sort=date%20desc%2C%20bibcode%20desc

Other activities:

I am currently:

- the member of the International Astronomical Union, European Astronomical Society, and Polish Astronomical Society

Past international activities:

- the Secretary of the Commission 19 “Astrophysics” of the International Union of Pure and Applied Physics (IUPAP) (2009 – 2011)
- the Scientific Editor of the Astrophysical Journal and other AAS Journals (years 2011-2020)