

=The VR form only
=The complete application

Marek Abramowicz, Göteborg University

**VR travel grant application
to attend a Conference**

>>Triggering Relativistic Jets<<

**to be held from 28 March to 1 April 2005,
in Cozumel (Mexico).**

Homepage [http: http://www.astroscu.unam.mx/reljet05/](http://www.astroscu.unam.mx/reljet05/)

My invited lecture:

**The fundamental aspects of black hole physics
in an astrophysical setting**

Bestämmelser på nästa sida. Ansökan med bilagor inges i ett original och en kopia

Sökandes efternamn Abramowicz		Kön Kvinnor <input type="checkbox"/> man <input checked="" type="checkbox"/>	Sökandes personnummer 450609-0937	
Sökandes förnamn Marek		Titel Professor		
Medsökande (efternamn och förnamn) XXX		Sökandes postadress (till institution eller motsvarande) Department of Astrophysics Gothenburg University c/o Theoretical Physics Chalmers University of Technology 412-96 Gothenburg		
Medsökande XXX		Titel XXX		
Medsökande XXX		Titel XXX		
Bidraget förväntas av School of Physics, Chalmers University		Adress för e-post marek@fy.chalmers.se		
Resan företas under tiden 28 March - April 1, 2005		Telefon +46(31)772-3135	Telefax +46(31)772-3204	
Resans ändamål To attend the conference "Triggering Relativistic Jets" in Cozumel (Mexico)				
Ytligt om sökandens lön betalas med medel ur forskningsbidrag	Bidragsgivare XXX	Bidragssnehavare XXX	Distansnummer (om bidragsgivaren är VR) XXX	
Projektbidrag innevarande budgetår	Bidragsgivare XXX	Bidragssnehavare XXX	Belopp XXX	Distansnummer (om bidragsgivaren är VR)
Deltar annan person från sökandens institution i konferensen (motsvarande)? Ja <input type="checkbox"/> Nej <input checked="" type="checkbox"/>				
Ytligt om föregående fråga besvarats med ja	Namn		Finansieringsstift	
Titel på eget föredrag till konferensen (eller motsvarande) The fundamental aspects of black hole physics in an astrophysical setting			Föredragets längd (minuter) 45min	
Webbadress för konferensen Ja <input type="checkbox"/> Nej <input checked="" type="checkbox"/>				
Bidrag för samma ändamål söks från följande källor Söks ej <input checked="" type="checkbox"/>				
Bidrag för samma ändamål har erhållits från följande källor Har ej erhållits <input checked="" type="checkbox"/>				
Besked önskas senast (datum) before end of January, 2005				
Ansökan skall åtföljas av (gäller bestämmelsernas alla fyra punkter, om inget annat anges):				
<ul style="list-style-type: none"> • Utförlig motivering för resan • Utförlig motivering varför ytterligare medel behövs utöver de eventuella projektmedel som erhållits (avser ej resor till EMBL (filialerna i Grenoble och Hamburg), ISIS (RAL, Chilton), NOT (La Palma), NSLS (BNL, Upton, NY), SEST (ESO, La Silla) eller SRS (DL, Daresbury)) • Personlig inbjudan (avser p 1 samt i förekommande fall p 2 - 4) • Bekräftelse på att expertmettid erhållits (avser p 3, i förekommande fall) • Tillstyrkan av handledare (i förekommande fall) 		<ul style="list-style-type: none"> • Förteckning över sökandens deltagande i konferenser (motsv) och studieresor utomlands under de två senaste åren, med uppgift om vilka som bekostat deltagandet • Meritförteckning med relevant publikationslista • Konferensprogram, konferensens (motsv) uppläggning och syfte skall klart framgå (avser punkt 1) • Rapport, ca en A4-sida, över senast genomförda resa med resebidrag från Vetenskapsrådet eller f d NFR/TFR (om sådan redogörelse inte lämnats in tidigare) 		

KOSTNADSSAMMANSTÄLLNING

Resekostnader (färdväg, färdstätt) plane Goteborg-Cozumel-Goteborg	Sökt belopp	ifylls ej
	Summa	9.476 kr
Traktamenten, arvoden Hotel in Cozumel 110\$/night, for 7 nights 7 x 110\$ = 770\$ = 5304kr	Summa	5.304 kr
Hotellkostnader Perdiem for 8 days (a 414kr/day) = 3312kr	Summa	3.312 kr
Konferensavgifter och övriga kostnader (specificeras)	Summa	
Totala kostnader	18.092 kr	
Avgår - från annat håll erhållet bidrag		
Avgår - förmåner som ingår i konferensen (motsvarande)		
Summa	18.092 kr	

Datum för ansökan	Underskrift
November 18, 2004	

BESTÄMMELSER

De som har projektbidrag med medel till materiel, resor m m från Vetenskapsrådet bör endast i undantagsfall söka resebidrag. Denna inskränkning gäller ej i vissa fall av punkt 3 nedan. När innehavare av löpande projektbidrag, med avsatt ram för materiel, resor m m, söker bidrag ur reseprogrammet skall skälet till att ytterligare resemedel söks motiveras utförligt. I samtliga fall gäller att resan skall vara angelägen från vetenskaplig synpunkt. Vidare gäller att ansökan måste vara utformad på ett sådant sätt att en meningfull granskning och bedömning kan göras inför ett beslut. Bidrag ges inte till medföljande familjemedlemmar.

Ansökan om resebidrag skall vara inkommen senast två månader före avresedatum.

Ansökningar behandlas ej mellan den 15 juni och 15 augusti.

- Bidrag till forskares deltagande i kongress, konferens eller symposium kan endast beviljas om forskaren erhållit en personlig inbjudan (inbjudan av arrangörerna) att hålla föredrag och om mötet bedöms vara av klart intresse för svensk naturvetenskap och/eller teknikvetenskap. Posterpresentationer godtas ej.
- Bidrag kan beviljas om den sökande är utsedd att representera Sverige i sammanhang som bedöms vara av stor betydelse för svensk naturvetenskap och/eller teknikvetenskap (internationella organisationer o dyl). Normalt motiverar inte arbete i organisationskommittéer bidrag ur reseprogrammet.
- Bidrag för utrikes resa (högst två månader) kan beviljas till:
 - forskare som fått möjlighet att utnyttja en internationell anläggning, ett utländskt laboratorium eller motsvarande.
 - internationellt forskningssamarbete.
 - insamlingsresor för biodiversitetsforskning.
- Bidrag kan beviljas för kortare gästforskarbesök (högst en månad) vid svenska institutioner.

Ytterligare upplysningar kan erhållas från rådets kansli, Mona Berggren, e-post mona.berggren@vr.se, tel 08-546 44 246, fax 08-546 44 144.

Detailed motivation for the travel

There are three rather important reasons for me to attend this Conference.

The very first reason is that my role in this Conference is a rather substantial one. As a member of the Scientific Organizing Committee, I influenced the program and the choice of invited speakers. I am an invited speaker myself, and in addition, I will give the very first opening lecture at the Conference.

The second reason is that the very subject of the conference, triggering relativistic jets, is one of the most interesting in the black hole astrophysics. The jets and outflows remain an unsolved challenge. Several experts are convinced that some fundamental physics, maybe yet unknown, is involved here. I made recently strong cases against the two most popular theoretical models for jets and outflows: the Blandford-Znajek mechanism, and the "adios" type accretion. Both Blandford-Znajek and adios models are connected to some basic issues here, and will certainly be discussed at length by several lecturers during the Conference. Although my criticism of these models was published and is known, not all of its technically difficult details are fully appreciated yet (or even understood properly) by a sizable fraction of the astrophysical community. At the conference in Cozumel, I will have an excellent possibility to explain these points to many expert colleagues --- not only in general during my invited talk, but also in individual deep discussions and chats.

The third reason is that this Conference is for me a very practical opportunity to meet my Mexican and Californian collaborators, Omer Blaes, William Lee, and Robert Wagoner. We are already working on another fascinating subject, probably not directly connected to the jet phenomenon --- the kilohertz, quasi periodic oscillations (QPOs) in X-ray fluxes that are observed from several neutron star and black hole sources. It is obvious that QPOs directly reflect super-strong Einstein's gravity. For this reason, and because of their puzzling properties, QPOs attracted a lot of attention of observers and theoreticians. I recently proposed (together with Wlodek Kluzniak, who will also attend the Conference) a non-linear resonance model to explain QPOs. Our model is already widely known and studied by many researchers. Blaes, Kluzniak, Lee, Wagoner and I plan that during the conference in Cozumel we decide about details of calculations that each of us must done prior to my longer visit to California in June and July, when we plan to intensely work together, and conclude this particular stage of our research.

I would like to add that the importance of the QPOs research, and our world leading role in it, is recognized not only world-wide, but also closer to home. I was recently awarded a prestigious Nordita's visiting fellowship, and received a sizable Nordita grant. In 2005-2007, as the Corresponding Fellow at Nordita, I will run the QPOs research in the Nordic countries under the Nordic Project *Quasi Periodic Oscillations in Black Hole and Neutron Star sources*. A large part of this research will be conducted at Goteborg University, where I am the Professor of Astrophysics and Chair, and during my visits to Nordita, and Nordita's grant pays fully for these research activities. However, the Project crucially depends on the collaboration with Blaes, Kluzniak, Lee, Wagoner and a few other colleagues from overseas. In order to support Project's activities outside the Nordic region, I must apply for additional funds --- this is indeed a strategy adapted by Nordita's Nordic Projects. It is rather a cost-effective one, because it helps to build international research teams with sufficient manpower and competence, necessary to achieve world's standards of research. I have a personal experience which shows that this strategy really works. Ten years ago, I lead another Nordita's Nordic Project that was devoted to the adaf-type black hole accretion. Nordita's grant, and several additional grants that I was able to secure, were instrumental in the visible success of the Project. They elevated research of our Swedish team to enjoy world's status and recognition. Indeed, my 1995 Ap.J.Lett. paper on the adaf-type accretion, has been designated by the ISI Web of Science as a "Citation Classic": the most highly world wide cited paper by a Swedish author in physics, chemistry, astrophysics, and earth sciences in years 1995-1999.

Personal invitation as a speaker at the conference

Subject: Invitation, Relativistic Jet Conference
From: "William Henry Lee Alardin"
Date: Wed, November 17, 2004 20:36
To: "Marek Abramowicz"

Dear Marek,

We hope this email finds you well. The purpose of this message is to formally request that you to be an invited speaker at the upcoming 2005 Relativistic Jet Conference. The meeting, entitled "Triggering Relativistic Jets" will focus on accretion and relativistic winds and jets in microquasars, magnetars, pulsars, gamma-ray bursts and quasars. Particular importance will be attached to the interactions between outflows and accretion in an attempt to better understand how these prime movers are able to release energy from the accreting gas and the spin energy of the central object.

We hope that you can concentrate your presentation on the fundamental aspects of black hole physics in an astrophysical setting.

The meeting will be held at the Park Royal Hotel, in Cozumel, Mexico from March 28 to April 1, 2005, one week before the ITP program is scheduled to start. The SOC includes M. Abramowicz, M. Begelman, L. Bildsten, R. Blandford, A. Carraminana, A. Fabian, W. Kluzniak, C. Kouveliotou, S. Kulkarni, W. Lee (co-chair), D. Page, E. Ramirez-Ruiz (co-chair), M. Rees, L. Rodriguez, I. Shlosman, R. Sunyaev, C. Thompson, V. Usov, R. Wagoner and S. Woosley.

In closing, we would be pleased and honored if you would consent to be an invited speaker at the conference. Please reply at your earliest convenience.

We hope to be able to provide ample support for graduate students and young researchers.

Should you decide to participate, we will waive the registration fee. If necessary for you, we can provide partial support for local expenses.

On behalf of the Scientific Organizing Committee,

William & Enrico

William H. Lee
Instituto de Astronomia, UNAM
wlee@astroscu.unam.mx

Enrico Ramirez-Ruiz
Institute for Advanced Study
enrico@ias.edu

Curriculum vitae

Name: Marek A. Abramowicz
9 June 1945, Chelm, Poland
Citizenship: Polish, Swedish
Married to: Henryka Kozicka
Daughter: Weronika Abramowicz
Son: Tomasz Abramowicz

Undergraduate studies:
University of Wroclaw
astronomy, mathematics, Master 1968

Graduate studies:
Warsaw University
theoretical physics, Ph.D. 1974
Supervisor: Andrzej Trautman

Habilitation:
Göteborg University 2000

Present position (permanent):
Professor of Astrophysics and Chair
Göteborg University

Past professorships:
SISSA, Trieste
University of Catania
Nordita, Copenhagen

I am Professor of Astrophysics (Chair) at Göteborg University and Chalmers University of Technology. In 1974 I earned my Ph.D. in theoretical physics from Warsaw University. After that I worked for several years at Stanford University and University of Texas at Austin. Later, for more than a decade, I collaborated closely with Dennis Sciama, first at Oxford University and then at the International School for Advanced Studies in Trieste. For twenty years I was a member of the Academic Board at the Salam's International Centre of Theoretical Physics in Trieste. In 1990-1994 I was professor of astrophysics at Nordita, the Nordic Institute for Theoretical Physics in Copenhagen. My interests include accretion discs theory, active galactic nuclei, neutron stars, black holes, nature of inertial forces and quantum effects in strong gravity. I supervised more than ten doctorates, and published more than 150 research articles.

List of publications 1999-2004

1. **I.V. Igumenshchev, A.F. Illarionov and M.A. Abramowicz**
Hard X-Ray-emitting Black Hole Fed by Accretion of Low Angular Momentum Matter
The Astrophysical Journal Letters, 517, 55L (1999)

2. **M.A. Abramowicz**
Gravitational radiation in optical geometry applied to super-compact stars
Physics Reports, 311, 325 (1999)

3. **I.V. Igumenshchev and M.A. Abramowicz**
Rotating accretion flows around black holes: convection and variability
Monthly Notices of the Royal astronomical Society, 103, 309 (1999)

4. **V. Karas, B. Czerny, Abrassart and M.A. Abramowicz**
A cloud model of active galactic nuclei: the iron Ka line diagnostics
Monthly Notices of the Royal astronomical Society, 318, 547 (2000)

5. **I.V. Igumenshchev and M.A. Abramowicz**
Two-dimensional Models of Hydrodynamical Accretion Flows into Black Holes
The Astrophysical Journal, Supplement Series, 130, 463 (2000)

6. **R. Narayan, I.V. Igumenshchev and M.A. Abramowicz**
Self-similar Accretion Flows with Convection
The Astrophysical Journal, 539, 798 (2000)

7. **I.V. Igumenshchev, M.A. Abramowicz and R. Narayan**
Numerical Simulations of Convective Accretion Flows in Three Dimensions
The Astrophysical Journal Letters, 537, 27L (2000)

8. **M.A. Abramowicz, J.-P. Lasota and I.V. Igumenshchev**
On the absence of winds in advection-dominated accretion flows
Monthly Notices of the Royal astronomical Society, 314 775 (2000)

9. **M.A. Abramowicz, G. Björnsson and I.V. Igumenshchev**
Accretion Disks Phase Transitions: 2-D or Not 2-D?
Publications of the Astronomical Society of Japan, 52, 295 (2000)

10. **S. Sonego, J. Almergren M.A. Abramowicz**
Optical geometry for gravitational collapse and Hawking radiation
Physical Review D, 62, 4010 (2000)

11. **M.A. Abramowicz, W. Kluzniak, J.-P. Lasota**
The centrifugal force reversal and X-ray bursts
Astronomy and Astrophysics, 374, L16 (2001)

12. **M.A. Abramowicz, I.V. Igumenshchev**
How Dim Could Accreting Black Holes Be?
The Astrophysical Journal Letters 554, 53L (2001)

13. **M.A. Abramowicz, W. Kluzniak**
A precise determination of black hole spin in GRO J1655-40

Astronomy and Astrophysics, 374, L19 (2001)

14. **W. Kluzniak and M.A. Abramowicz**
Strong field gravity and orbital resonance in black holes and neutron stars --- kHz quasi periodic oscillations
Acta Physica Polonica B, B32, 3605 (2001)

15. **M.A. Abramowicz, L. Rezzolla, S. Yoshida**
General relativistic Rossby-Haurwitz waves of a slowly and differentially rotating fluid shell
Classical and Quantum Gravity, 19, 191 (2002)

16. **M.A. Abramowicz, I.V. Igumenshchev, E. Quataert, R. Narayan**
On the Radial Structure of Radiatively Inefficient Accretion Flows with Convection
The Astrophysical Journal 565, 1101 (2002)

17. **R. Narayan, E. Quataert, I.V. Igumenshchev, M.A. Abramowicz**
The Magnetohydrodynamics of Convection-dominated Accretion Flows
The Astrophysical Journal 577, 295 (2002)

18. **M.A. Abramowicz, I. Bengtsson, V. Karas, K. Rosquist**
Poincare ball embeddings of the optical geometry
Classical and Quantum Gravity 19, 3963 (2002)

19. **M.A. Abramowicz, G.J.E Almergren, W.Kluzniak, A.V Thampan and F. Wallinder**
Holonomy invariance, orbital resonances and kilohertz QPOs
Classical and Quantum Gravity 19, L57 (2002)

20. **M.A. Abramowicz, W.Kluzniak, and J.-P. Lasota**
No observational proof of the black-hole event-horizon
Astronomy and Astrophysics 396, L31 (2002)

21. **M.A. Abramowicz, and W.Kluzniak**
Epicyclic Orbital Oscillations in Newton's and Einstein's Dynamics
General Gravity and Gravitation 31, 69 (2003)

22. **M.A. Abramowicz, V. Karas, W. Kluzniak, W.H. Lee, P. Rebusco**
Non-Linear Resonance in Nearly Geodesic Motion in Low-Mass X-Ray Binaries
Publication of Astronomical Society of Japan 55, 467 (2003)

23. **M.A. Abramowicz, T. Bulik, M. Bursa, W. Kluzniak**
Evidence for a 2:3 resonance in Sco X-1 kHz QPOs
Astronomy & Astrophysics Letters 404, 21 (2003)

24. **M.A. Abramowicz**
Book Review: Black Hole Gravito-hydro-magnetics. By Brian Punsly. 395p. Springer-Verlag, Heidelberg, 2001
General Relativity and Gravitation 35, 113 (2003)

25. **I.V. Igumenshchev, R. Narayan, M.A. Abramowicz**
Three-dimensional Magnetohydrodynamic Simulations of Radiatively Inefficient Accretion Flows
The Astrophysical Journal 592, 104 (2003)

26. **R. Narayan, I.V. Igumenshchev, M.A. Abramowicz**
Magnetically Arrested Disk: an Energetically Efficient Accretion Flow
Publications of Astronomical Society of Japan Letters 55, 55 (2003)

27. **W.H. Lee, M.A. Abramowicz, W. Kluzniak**
Resonance in Forced Oscillations of an Accretion Disk and Kilohertz Quasi-periodic Oscillations
The Astrophysical Journal Letters 603, 93 (2004)

28. **W. Kluzniak, M.A. Abramowicz, S. Kato, W.H. Lee, N. Stergioulas**
Nonlinear Resonance in the Accretion Disk of a Millisecond Pulsar
The Astrophysical Journal Letters 603, 89 (2004)

29. **M.A. Abramowicz, W. Kluzniak, J.E. McClintock, R.A. Remillard**
The Importance of Discovering a 3:2 Twin-Peak Quasi-periodic Oscillation in an Ultraluminous X-Ray Source, or How to Solve the Puzzle of Intermediate-Mass Black Holes

The Astrophysical Journal Letters 609, L63 (2004)

30. **M.A. Abramowicz**
Book Review: Gravitation: Following the Prague Inspiration.
General Gravity and Gravitation, 36, 1507 (2004)

31. **J. Horák, M.A. Abramowicz, V. Karas, W. Kluzniak**
Of NBOs and kHz QPOs: a Low-Frequency Modulation in Resonant Oscillations of Relativistic Accretion Disks
Publications of the Astronomical Society of Japan, 56, 819 (2004)

32. **M.A. Abramowicz, W. Kluzniak**
Interpreting black hole QPOs
American Institute of Physics, 714, 21 (2004)

33. **M. Bursa, M.A. Abramowicz, V. Karas, W. Kluzniak**
The upper kHz QPO: a gravitationally lensed vertical oscillation
The Astrophysical Journal Letters, 617, out in print in December (2004)

6. A short description for the purpose of the conference

Although a wide variety of astrophysical objects produce powerful jets, a comprehensive physical theory of their formation is still lacking. This conference will bring together experts in theory, simulation, and observation to discuss the general ways by which gravity, spin and the electromagnetic field can combine to power some of the most extensively observed high energy phenomena in astrophysics.

The meeting will focus on accretion and relativistic winds and jets in microquasars, magnetars, gamma-ray bursts and quasars. Particular importance will be attached to the interactions between outflows and accretion in an attempt to better understand how these prime movers are able to release energy from the accreting gas and the spin energy of the central object.

7. Participation in conferences

2003

1. Black Holes in the Universe International summer school

Cargèse, Corsica (France) May 12-24, 2003

<http://www-dapnia.cea.fr/Phys/Sap/Conferences/cargese2003/circular1.shtml>

I had an 8 hour series of lectures "Accretion around black holes", and was a member of the School scientific committee (other members: Eric Gourgoulhon, Jean-Marie Hameury, Jacques Paul, Rachid Sunyaev).

2. Nordita Master Class in Physics,

Den Nordiske Lejrskole, Hillerød (Denmark) 3-10 August, 2003

<http://www.nordita.dk/conference/MasterClass2003/>

I had a 5 hour series of lectures "Theory of accretion disks around black holes"

3. Tenth Marcel Grossmann Meeting on General Relativity

Rio de Janeiro (Brazil), July 20-26, 2003

<http://www.cbpf.br/mg10/WelcomeNew.html>

I had two invited lectures at two parallel sessions: "QPOs Resonance Theory" (20min), "Numerical simulations of accretion disks" (20min), and was a rapporteur at another session (30min).

4. The 25th Anniversary of the Copernicus Centre

Warsaw (Poland), September 20-25

I had an invited lecture "Active Galactic Nuclei" (1hr).

5. 5th RagTime Workshop

Opava (Czech Republic), 13-15 October, 2003

<http://uf.fpf.slu.cz/rag/time5/>

I had an invited lecture "The Ultra Luminous X-ray sources: intermediate mass black holes?" (1hr).

6. X-Ray Timing 2003: Rossi and Beyond

CfA, Harvard (U.S.A.), November 3-5, 2003

<http://hea-www.harvard.edu/xrt2003/>

I had an invited lecture "Interpreting black hole QPOs" (30min)

2004

1. QPOs in strong gravity

Wojnowice Castle (Poland), February 22-28, 2004

<http://fy.chalmers.se/~number44/conferences04/wojnowice2004/index.html>

I have myself organized this Workshop. It was attended by three senior participants (M.A. Abramowicz, V. Karas, W. Kluzniak) and four graduate students. Three papers have been completed during the Workshop. One is already printed (position 31 in the publication list), two other accepted for publications: astro-ph/0406586, astro-ph/0401464. The Workshop was supported by my VR research grant.

2. Nordita Days on Slim Disks

Nordita, Copenhagen, March 11-14, 2004

<http://www.nordita.dk/~brandenb/get-together/meetings/slimdisks04.html>

I have organized this Nordita Workshop together with Axel Brandenburg of Nordita

3. Growing Black Holes:

Accretion in a Cosmological Context

Max-Planck-Institute, Garching (near Munich), June 21-25, 2004

<http://www.mpa-garching.mpg.de/~bh-grow/>

I had an invited lecture: "Super-Eddington accretion". The text of my lecture is at <http://arxiv.org/abs/astro-ph/0411185>

My participation at this conference was supported by a VR travel grant.

4. From X-ray Binaries to Quasars:

Black Hole Accretion on All Mass Scales

University of Amsterdam, July 13-16

I had an invited lecture: "The 1/M scaling".

My participation at this conference was supported by a VR travel grant.