

## DR. PAUL BAKI

### RESEARCH INTEREST

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*Space Physics, General Relativity and Gravitational  
Physics, Astronomy and Astrophysics*

### DATE OF BIRTH

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14<sup>th</sup> October 1966

### MARITAL STATUS

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Married

### ADDRESS

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Department of Physics, University of Nairobi, P.O. Box 30197, 00100,  
GPO, NAIROBI.

### NATIONALITY

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Kenyan

### EDUCATION

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1995 – 1999	University of Nairobi, Kenya, Ph.D (Physics)
1991 – 1993	University of Nairobi, Kenya, M.Sc. (Physics)
1988 – 1991	University of Nairobi, Kenya, B.Sc. (Hons)
1986 – 1987	St. Mary's School, Yala, A-Level Certificate
1982 – 1985	Cardinal Otunga High School, Mosoch, O-Level Certificate
1975 - 1981	Ragengni Primary School, C.P.E. Certificate

### WORK EXPERIENCE

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July 2003- To date

**Senior Lecturer** – Department of Physics, University of Nairobi.

Feb. 2000 – June 2003    **Lecturer** - Department of Physics, University of Nairobi

Sept.1995 – Jan 2000    **Tutorial Fellow** - Department of Physics, University of Nairobi

Oct.1993 – Sept.1995    **Graduate Assistant-** Department of Physics, University of Nairobi

1992 – 1994                **Occupational Health and Safety Officer** - Ministry of Labour

### **OTHER DUTIES**

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**2006- To date** -    **Head of Publications** – Department of Physics Quarterly/Annual Reports

**2005- To date** -    **Member**, Occupational Health & Safety Committee, College of Biological & Physical Sciences (CBPS)

**2002 – To date** - **Area Coordinator**, Space Science and its Applications, University of Nairobi /University of Rome “La Sapienza” Collaboration.

2000 – 2005 -    **Examinations Officer** - Department of Physics

1990 – 1991 -    **Chairman**- Nairobi University Physics Association (NUPA)

### **PROFESSIONAL AFFILIATIONS**

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**2004- To date**                **Member**, Kenya National Academy of Sciences (KNAS)

**2004 – To date**                **Associate Member**, Committee On Space Research (COSPAR)

**2003- To date**                **Member**, Working Group on Space Sciences in Africa ( WGSSA)

**2003- To date**                **Member**, Universities Academic Staff Union (UASU).

**2002-To date**                **Member**, University of Nairobi Science Park and Museum Committee.

**2004-2007**                    **TWAS Visiting Associate-** Centro Brasileiro Pesquisas de Fisicas (CBPF)- Rio de Janeiro, Brazil

**2001- 2002**                    **TWAS Visiting Associate-** Inter-University Centre for Astronomy & Astrophysics, Pune, India.

**2000 – 2005**                    **Member** -Faculty of Science Postgraduate Studies Committee

## ACTIVITIES IN PROMOTION OF UNIVERSITY OF NAIROBI IMAGE

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1. **Public Outreach** – Organized an exciting Night Sky-viewing using a **5 inch telescope** donated by the South African Astronomical Observatory (SAAO) - on 31<sup>st</sup> March 2008 at Chiromo campus and on 1<sup>st</sup> April 2008 at Kenya High School.
2. **International Year of Astronomy ( IYA 2009)** – Serving as International Astronomical Union’s (IAU) Single Point of Contact (SPoC) and Chairman of Steering Committee organizing events in promotion of the teaching of astronomy and its benefits to the society. These will be a series of activities spanning 2008- 2010 and will also involve public outreach.
3. **Public Lecture- “Physics in the Management of Public Affairs”** University of Nairobi Open Day 25<sup>th</sup> – 26<sup>th</sup> April 2008.

## SEMINARS/CONFERENCES CONVENED

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**11<sup>th</sup>-12<sup>th</sup> Nov. 2004** - Workshop on Science and Technology Research Policy for Sustainable Development in Kenya, Hotel Milimani, Nairobi, Kenya.

**21<sup>st</sup> – 31<sup>st</sup> Jan 2002** - The Second Workshop on Image Analysis and Remote Sensing Techniques, Silver Springs Hotel, Nairobi, Kenya

## SEMINARS AND CONFERENCES AND WORKSHOPS PARTICIPATION

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| <b>11<sup>th</sup> – 16<sup>th</sup> November 2007</b> | ➤ International Helio-Physical Year – Africa Space Weather Science and Education Workshop, Ghion Hotel, Addis Ababa Ethiopia    |
| <b>25<sup>th</sup> October 2007</b>                    | ➤ Workshop on Results Based Management, University of Nairobi   |
| <b>1<sup>st</sup> – 3<sup>rd</sup> October 2007</b>    | ➤ Pedagogy Workshop, University of Nairobi, Kenya.  |
| <b>14<sup>th</sup>- 25<sup>th</sup> August 2006</b>    | ➤ 26 <sup>th</sup> General Assembly of the International Astronomical Union, Prague, Czech Republic.                            |
| <b>29<sup>th</sup>-30<sup>th</sup> June 2006</b>       | ➤ National Symposium on Science, Technology and Society: African Perspectives and Experiences, Pan Afric Hotel, Nairobi, Kenya. |
| <b>8<sup>th</sup>-9<sup>th</sup> December</b>          | ➤ National Workshop on Science and Technology Capacity in the   |

- 2005 Framework of Millenium Development Goals, Nairobi, Kenya.
- 11<sup>th</sup>-12<sup>th</sup> Nov. 2004 ➤ Workshop on Science and Technology Research Policy for Sustainable Development in Kenya, Hotel Milimani Nairobi, Kenya.
- 27<sup>th</sup>June– 9<sup>th</sup>July 2004 ➤ Regional Workshop for African Astronomers and Space Scientists: Data Processing from the Chandra and XMM-Newton Space Missions, Durban, South Africa.
- 12<sup>th</sup> Jan. 2004 ➤ Workshop on Research Ethics, Maseno University, Kenya.
- 29<sup>th</sup> - 31<sup>st</sup> Oct 2003 ➤ Workshop on Science with Southern African Large Telescope (SALT), Cape Town , South Africa
- 7<sup>th</sup> August 2003 ➤ Tutors Workshop for Bed (Science), distance learning Programme, Chiromo Campus, University of Nairobi, Kenya.
- 8<sup>th</sup>-18<sup>th</sup> June 2003 ➤ Writers Workshop for BEd(Science), Distance Learning Programme, Machakos, Kenya.
- 21<sup>st</sup> – 31<sup>st</sup> Jan 2002 The Second Workshop on Image Analysis and Remote Sensing Techniques, Silver Springs Hotel, Nairobi, Kenya
- 8<sup>th</sup> – 10<sup>th</sup> Oct. 2001 Workshop on Celestial Mechanics and Dynamical Systems, IUCAA, Pune, India.
- 26<sup>th</sup> – 15<sup>th</sup> July 2000 ➤ 25<sup>th</sup> International Nathiagali Summer College on Physics and Contemporary Needs, Burban, Islamabad, Pakistan.
- 19<sup>th</sup> – 21<sup>st</sup> Jan 2000 ➤ DAAD and University of Nairobi Seminar on Scholarly Writing, 8-4-4 Building, University of Nairobi.
- 29<sup>th</sup> Oct. 1998 ➤ DAAD and University of Nairobi Seminar on “Universities Building Bridges and Crossing Frontiers for Development”, Nairobi Safari Club
- 12<sup>th</sup> June–28<sup>th</sup> July 1997 ➤ ➤ Summer School in High Energy Physics and Cosmology, ICTP, Trieste, Italy.
- 12<sup>th</sup> – 30<sup>th</sup> Nov. 94 ➤ Regional Course on Plasma Physics, Quid-I-Azam University, Islamabad, Pakistan
- 26<sup>th</sup> Sept. – 1<sup>st</sup> Oct. 94 ➤ Exhibition- Nairobi International Show, “Intensify Rural and Industrial Development”
- 9<sup>th</sup> – 20<sup>th</sup> Nov. 1992 ➤ Course on Occupational Health and Safety Services, Ministry of Labour, Industrial Area, Nairobi
- 21<sup>st</sup> – 25<sup>th</sup> Sept. 1992 ➤ 1<sup>st</sup> Regional/6<sup>th</sup> Annual General Conference of the Kenya National Association of Physicists, University of Nairobi, Kenya.
- 19<sup>th</sup> – 21<sup>st</sup> Sept. 1990 ➤ 4<sup>th</sup> Annual General Conference on Physics in Innovations for Development, University of Nairobi, Kenya.

## OUTSTANDING ACHIEVEMENTS

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1. **Curriculum Development** - Developed ( with the support of International Astronomical Union- IAU and South African Astronomical Observatory- SAAO) a BSc Astronomy & Astrophysics syllabus for the University of Nairobi.
2. **Research Collaboration** - has initiated a research collaboration between:
  - (i) The University of Nairobi and the **United States Air-Force Research Laboratory (AFRL)** in the area of Space Physics . Received and installed **GPS Receiver** equipment on the roof –top of Physical Sciences building for studies of the effect of ionospheric disturbances on telecommunications and air navigation. Value of equipment – **Ksh 2 Million.**
  - (ii) The University of Nairobi and Stanford University Solar Centre - Received two **Sudden Ionospheric Disturbance (SID) VLF Monitors** for students research projects on space weather. Equipment worth **Ksh 20,000.**
  - (iii) The University of Nairobi and Kyushu University, Japan – **Magnetic Data Acquisition System (MAGDAS)** to be installed at Chiromo Campus and be used for monitoring changes in the earth’s magnetic field, which are occasioned by solar flares. These can cause disruptions for power transmission, communications, and navigation.  
Value of equipment – **Ksh 10 Million.**
3. **Open Night with Telescope** - Held an open night viewing with a telescope at Chiromo Campus and at Kenya High School.
4. **Scholarships** - Organized scholarships for two of our students **Anne Nzioki** and **Geoffrey Okengo** , Masters with a possibility of upgrading to PhD , to University of Cape Town to join the National Astrophysics and Space Science Programme (NASSP) as part of our Capacity building initiatives for our Astronomy and Astrophysics BSc Programme.

## PUBLICATIONS IN REFEREED JOURNALS

1. **P. Baki**, *Astronomy In The Cultural Heritage Of African Societies*, Innovations in Astronomy Education, eds. Jay M. Pasachoff, Rosa M. Ros, and Naomi Pasachoff, published by Cambridge University Press, pp 288 (2008).
2. **P. Baki & P. Martinez**, *Discovery of a low frequency pulsation in the Ap Star the HD117290*, Monthly Notices of the Royal Astronomical Society, (2007) ( In preparation)
3. **P. Baki**, *Finsler Spaces, Violation of Lorentz Symmetry and Flavour Oscillation Phases*, General Relativity and Gravitation, (2007) – under review.
4. **P. Baki**, *A Geometric Representation of The Electromagnetic Field in Finsler Spaces*, Maseno Journal of Education, Arts and Science, 112 ( 2007)
5. **P. Baki** and **C. Mito**, *A spectral Analysis of Binary Systems X-Ray Data from XMM – Newton Space- Craft Using SAS software*, African Skies, ( In Press).
6. **P. Baki**, *A possible Electromagnetic Singularity in Finslerian Space-times*, African Journal of Science and Technology, vol. 7, No. 2, 106 ( 2006).
7. **P. Baki**, *Lorentz- Non-invariance Effect on Flavour Oscillations*, General Relativity and Gravitation, Vol. **35**, 891(2003)
8. **P. Baki**, *Unification of Gravitation and Electromagnetism in a Relativistic Version of Finslerian Geometry*, African Journal of Science and Technology, Vol.3 No.2,101 (2002).
9. **P. Baki** and **J. O. Malo**, *Cauchy Analysis of the Linearized Anti-symmetric Sector of the Massive Non-symmetric Gravitational Theory*, J. Math. Phys. Vol7, No.40, 3439 (1999).
10. **P. Baki** – *Hypersurface Orthogonal Decomposition And Analysis of the Linearized Anti-Symmetric Sector of the Massive Non-Symmetric Gravitational Theory*, Ph.D Thesis, University of Nairobi, (1999)

## PUBLICATIONS IN CONFERENCE PROCEEDINGS

1. **P. Baki**, *Kenya Space Science and Technology Centre*, a Concept paper submitted to the Kenya National Commission for Unesco and Kenya National Academy of Sciences, toward the establishment of the Space Science and Technology Centre in Kenya.
2. **P. Baki**, *Space Science Activities in Kenya and Data Reduction Capabilities*, Proceedings of the International Helio-Physical Year SCINDA 2007 Workshop, November 11<sup>th</sup> – 16<sup>th</sup>, 2007, Addis

Ababa Ethiopia.

3. **P. Baki**, *Astronomy in The Cultural Heritage of African Societies*, Astronomy for the Developing World, IAU GA XXVI SpS5, eds. John Hearnshaw and Peter Martinez, published by Cambridge University Press, 99 (2007),
4. **P. Baki**, *Contribution of Space Science in the Improvement of Quality of Life*, Proceedings of the Kenya National Academy of Sciences' National Symposium on Science Technology and Society, July 2006- in Press.
5. **P. Baki** and **M. Atieno**, eds, Proceedings of the Workshop on Science and Technology Research Policy for Sustainable Development in Kenya, July 2005.

### BOOKS AND MONOGRAPHS

1. **P. Baki**, *Astronomy in The Cultural Heritage of African Societies*, Astronomy for the Developing World, IAU GA XXVI SpS5, eds. John Hearnshaw and Peter Martinez, published by Cambridge University Press, 99 (2007).
2. **P. Baki**, *SPH 305: Classical Mechanics* , A peer reviewed Physics Lecture Module for Distance Learners, published by the University of Nairobi Press, (2006)
3. **P. Baki** , *SPH 201: Mechanics II*, A Peer Reviewed Physics Lecture Module for Distance Learners, published by the University of Nairobi Press, (2004)
4. **P. Baki**, Looking for Secrets in the Stars, Society Magazine, East African Standard, Saturday, August 28<sup>th</sup> (2004).
5. **P. Baki** , *SPH 101: Mechanics I*, A Peer Reviewed Physics Lecture Module for Distance Learners, published by University of Nairobi Press, ( 2003).

## CURRENT RESEARCH PROJECTS

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1. SPINOR THEORY OF GRAVITY
  2. STELLAR PULSATIONS
  3. IONOSPHERIC FLUCTUATIONS AND ITS EFFECTIONS ON TELECOMMUNICATIONS AND NAVIGATION
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## TEACHING

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### Undergraduates

Has taught many undergraduate courses among them: Quantum Mechanics, Mathematical Physics, Thermodynamics, Mechanics, Classical Mechanics, Electricity and Magnetism and Plasma Physics

### Postgraduates

Quantum Mechanics, Statistical Mechanics, Electrodynamics, Mathematical Physics, Classical Mechanics, Solid State Physics, Atomic and Molecular Physics, General Relativity, Astrophysics.

### Professional Lectures

24<sup>th</sup> March 2002 and 24<sup>th</sup> March 2003 on Space Science: Benefits to Mankind , National Defence College ,Karen, Nairobi, Kenya.

## POSTGRADUATE SUPERVISION

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### Master of Science

**Joyce W. Thairu:** The Neutrino See-Saw Mechanism in the Baryon Assymetry in The Universe, MSc Dissertation, University of Nairobi, 2006.

**Nzioki Anne – Marie:** The Large Scale Structure and Dark Matter in the Evolution of the Universe, MSc Dissertation, University of Nairobi, 2006.

### Doctor of Philosophy

**Dismas S. Wamalwa :** Gravito-Electromagnetic Duality in Finslerian Geometry, Ph.D Research Project ( On going)- Maseno University.

## REFEREES

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Prof. R. O. Genga  
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University of Nairobi  
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Prof. B. O. Aduda  
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Prof. G. Pokhariyal  
School of Mathematics  
University of Nairobi  
P.O. Box 30197  
NAIROBI, Kenya.