Personal Data

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Ph.D., MInstP. (UK), CPhys.(UK), FRAS(UK)

Education

B.Sc.(Hons.), First Class, University of Khartoum, Faculty of Science, 1989.

D.ICTP, Grade A-, International Center for Theoretical Physics (ICTP), Italy, 1992

Ph.D., University of Khartoum, 1997.

Postdoctoral fellow: Zululand University, South Africa, 1997.

Present Posts

Professor, University of Khartoum, Sudan: Deputy Director for Scientific Research and Cultural Relations

Past Experience

Assistant Professor: 1997-2000, University of Khartoum, Sudan

Associate Professor & Dean: 2001-2002, Comboni College for Computer Science

Assistant Professor: 1999-2002, Omdurman Ahlia University, Sudan

Assistant Professor: 2002-2006. Teachers College, King Saud University, Saudi Arabia

Associate Professor, 2006-2012, Omdurman Ahlia University, Omdurman, Sudan.

Deputy Dean, Omdurman Ahlia University, Omdurman, Sudan.

Current field of interest

Cosmology, astrophysics, applied mathematics, fundamental physics

List of Publications

[**1**] **Arbab I. Arbab**, Complex Maxwell's, Chinese Physics B, Vol.22, No.3, **030301** (2013).

[**2**] **Arbab I. Arbab**, The Fractional Hydrogen Atom: A Paradigm for Astrophysical Phenomena, Journal of Modern Physics, Vol.3, No.11, **1737** (2012).

[**3**] **Arbab I. Arbab**, The quantum Hall effect: A quantum electrodynamic phenomenon, Chinese Physics B, Vol.21, No.12, **127301** (2012).

[**4**] **Arbab I. Arbab**, Drude, Hall and maximal conductivities: A unified complex model, Journal of Modern Physics, Vol.3, No.9, 1040 (2012).

[**5**] **Arbab I. Arbab**, The complex quantum harmonic oscillator model, Europhysics Letters, V.98, 30008 (2012).

[**6**] **Arbab I. Arbab**, The generalized Newton's law of gravitation versus the general theory of relativity, Journal of Modern Physics, Vol.3, No.9, 1231 (2012).

[**7**] **Arbab I. Arbab**, Transport Properties of the Universal Quantum Equation, Chinese Physics Lett. Vol. 29, No. 3, 030304 (2012)

[8] **Arbab I. Arbab**, Post-Galilean transformations and their consequences, Sudan Journal of Science, Vol.5, No.1, 1 (2012)

[**9**] **Arbab I. Arbab** and **Faisal A. Yassein**, A new formulation of electrodynamics, Journal of Modern Physics, V.3, 163 (2012).

[**10**] **Arbab I. Arbab**, Cosmological model with variable gravitational ad cosmological

constants and bulk viscosity, Hadronic Journal, 34, No. 1, 1 (2011).

[**11**] **Arbab I. Arbab**, Stochastic model related to the Klein-Gordon equation revisited, Europhysics Letters, V.96, 20002 (2011).

[12] Arbab I. Arbab, The analogy between matter and electromagnetic waves, Europhysics Letters, V.94, 50005 (2011).

[**13**] **Arbab I. Arbab**, The analogy between electromagnetism and hydrodynamics, Physics Essays, V.24, Nr. 2, 254 (2011).

[**14**] **Arbab I. Arbab**, The quaternionic quantum mechanics, Applied Physics Research, 3, Nr. 2 160 (2011).

[**15**] **Arbab I. Arbab**, The unified quantum wave equations, Hadronic Journal, 33, 707 (2011).

[**16**] **Arbab I. Arbab**, The neutron model, Hadronic Journal, 33, 695 (2011).

[**17**] **Arbab I. Arbab**, On the electric and magnetic properties of conductors, Advanced Studies in Theoretical Physics, 5, 595 (2011).

[**18**] **Arbab I. Arbab**, Derivation of Dirac, Klein-Gordon, Schrodinger, Diffusion and quantum heat transport equations from a universal quantum wave equation, Europhysics Letter. V.92, 40001 (2010).

[**19**] **Arbab I. Arbab** and **Hisham M. Widatallah**, The mass-extended 't Hooft-Nobbenhuis complex transformations and their consequences, Europhysics Letter. V.92, 23002 (2010).

[**20**] **Arbab I. Arbab** and **Faisal A. Yassein**, A new formulation of electrodynamics, Journal of Electromagnetic Analysis and Applications (JEMAA), V.2, 502 (2010).

[**21**] **Arbab I. Arbab** and Hisham M. Widatallah, The generalized continuity equation, Chinese Phys. Lett. 27, 084703 (2010).

[**22**] **Arbab I. Arbab**, The gravitomagnetism: a novel explanation of the precession of planets and binary pulsars, Astrophys Space Sci. V330, No. 1, 61 (2010).

[**23**] **Arbab I. Arbab**, On the generalized Newton's law of gravitation, Astrophys. Space Sci. V325, 37 (2010).

[**24**] **Arbab I. Arbab**, A phenomenological model for the precession of planets and bending of light, Astrophys. Space Sci. V.325, 41 (2010).

[**25**] **Arbab I. Arbab**, On the gravitational radiation of gravitating objects, Astrophys. Space Sci. 323, 181 (2009).

[**26**] **Arbab I. Arbab** and **Zeinab A. Satti**, On the Generalized Maxwell Equations and Their Prediction of Electroscalar Wave, Progress in Physics, **2**, 8 (2009).

[**27**] **Arbab I. Arbab**, On the New Gauge Transformations of Maxwell's Equations, Progress in Physics, **2**, 14 (2009).

[**28**] **Arbab I. Arbab**, The Length of the Day: A Cosmological Perspective, Progress in Physics, 8, 1 (2009).

[**29**] **Arbab I. Arbab**, On the Tidal Evolution of the Earth-Moon System: A Cosmological Model, Progress in Physics, 54, V.1 (2009).

[**30**] **Arbab I. Arbab**, Viscous Dark Energy Variable G and ", Chin. Phys. Lett. . V.25, 3834 (2008).

[**31**] **Arbab I. Arbab**, Phantom Energy with Variable G and ", Chin. Phys. Lett. V.25, 4497, (2008): AIP Conf. Proc., April 17, 2009, Volume 1115, pp. 230-238, DOI:10.1063/1.3131504

[**32**] **Arbab I. Arbab**, Comment on "Five dimensional cosmological model with variable G and ", Chin. Phys. Lett. V.25, 351 (2008).

[**33**] **Arbab I. Arbab**, On the planetary acceleration and the Earth rotation, Astrophys. Space Sci. V.314, 35 (2008).

[**34**] **Arbab I. Arbab**, Cosmological Models with Generalized Einstein Action, Cosmological Models in the Generalized Einstein Action, Abraham Zelmanov Journal, V.2, 3 (2009) & ICTP/IC/2007/120, (2007).

[**35**] **Arbab I. Arbab**, A cosmic quantum mechanics, African J. of Math. Phys., V.2, N.1, 1, (2005).

[**36**] **Arbab I. Arbab,** Evolution of angular momenta and Energy of the Earth-Moon system, Acta Geod. Geoph. Hung., V.40, 33 (2005).

[**37**] **Arbab I. Arbab**, Temporal variation of the Earth-Moon parameters with cosmic evolution, Acta Geod. Geoph. Hung., V.39, 27 (2004).

[**38**] **Arbab I. Arbab**, A quantum universe and the solution to the cosmological problems, Gen. Rel. Gravit. V.36, 2465 (2004).

[**39**] **Arbab I. Arbab**, The equivalence between different dark (matter) energy scenarios, Astrophys. Space Sci. V.291, 141 (2004).

[**40**] **Arbab I. Arbab**, The Universe with bulk viscosity, Chin. J. of Astron. and Astrophys. V.3, 113 (2003).

[**41**] **Arbab I. Arbab**, Cosmic Acceleration with a positive cosmological constant, Class. Quant. Gravit. 20, 93 (2003).

[**42**] **Arbab I. Arbab**, Cosmological consequences of a built-in cosmological constant model, J. Cosm. Astro. Particle, V.5, 8 (2003).

[**43] Arbab I. Arbab**, FRW universe with variable vacuum energy density, Gravit. & Cosm. V8. 31, 227 (2002).

[**44**] **Arbab I. Arbab**, A coasting universe with vacuum energy, Spacetime & Substance V.2, 39 (2001).

[**45**] **Arbab I. Arbab**, Large scale quantization and the essence of the cosmological problems, Spacetime & Substance V.2, 55 (2001).

[**46**] **Arbab I. Arbab**, The evolving universe and the puzzling cosmological parameters, Spacetime & Substance V.2, 51 (2001).

[**47**] **Arbab I. Arbab** and A. Beesham, Causal dissipative cosmology with variable G and , Gen. Rel. Gravit. V.32, 516 (2000).

[**48**] **Arbab I. Arbab**, Cosmological implications of the viscous universe with variable G and, Astrophys. Space Sci.V.259, 371 (1998).

[**49**] **Arbab I. Arbab**, A flat viscous cosmological model with an increasing gravitational constant, Nouvo Cimento.V113B, 403 (1998).

[**50**] **Arbab I. Arbab**, Bianchi type I universe with variable G and, Gen. Rel. Gravit., V30, 1401 (1998).

[**51**] **Arbab I. Arbab**, Anisotropic universe with variable G and , Astrophys. Space Sci.V.246, 193 (1997).

[**52**] **Arbab I. Arbab**, Cosmological models with variable G, and bulk viscosity, Gen. Rel. Gravit.V.29, 61 (1997).

[**53**] **Arbab I. Arbab** and A.-M. M. Abdel Rahman, Nonsingular viscous universe with decaying vacuum energy, Nouvo Cimento, V.111B, 693 (1996).

[**54**] **Arbab I. Arbab** and A.-M. Abdel Rahman, Nonsingular cosmology with a time dependent cosmological term, Phys. Rev. D50, 7725 (1994).

Papers underreview

[**1**] Arbab I. Arbab, A Bohr-like model of the planetary system and its gravito-electric characteristics, 2012.

[**2**] Arbab I. Arbab, A novel model for Fractional Quantum Hall effect, 2012.

[**3**] Arbab I. Arbab, Space and time derivatives transformations and the longitudinal wave, 2012.

[**4**] Arbab I. Arbab, Derivation of Maxwell's equations from Quaternionic Dirac equations, 2013.

[**5**] Arbab I. Arbab, On the quantum mechanics of massive electrodynamics, 2013.

[**6**] Arbab I. Arbab, The extended gauge transformations, 2013.

[7] Arbab I. Arbab, The consequences of complex Lorentz force and violation of Lorenz gauge condition, 2013.

[**8**] Arbab I. Arbab, The quaternionic commutator bracket and its implications, 2013.

[**9**] Arbab I. Arbab and Mudhahir Al-Ajmi, The modified electromagnetism and the emergent longitudinal wave, 2013.

[10] Arbab I. Arbab, The emergent longitudinal wave from space and time derivatives, http://arxiv.org/abs/1202.5744.

[11] A. I. Arbab, Saadia E. Salih, Sultan H. Hassan, Ahmed Agali, The planetary spin and rotation period: A modern approach, http://arxiv.org/abs/1301.4720.

Workshop and Conference papers

[1] Arbab I. Arbab, On the analogy between the electrodynamics and hydrodynamics using quaternions, the 14th International Conference on Modelling Fluid Flow (CMFF'09), Budapest, Hungary, 9-12 September (2009)

[**2**] **Arbab I. Arbab**, Consparative cosmology with variable constants, New developments in quantum cosmology research, Horizon in world physics, V.247, Edited by: Reimer Albert, ISBN: 1-59454-321-6, Nova science publishers, USA, 2005.

[3] Arbab I. Arbab, The Cause of the Present Cosmic Acceleration (**Poster**), Proceedings of the 22nd Texas Symposium on Relativistic Astrophysics at Stanford California, December 13-17, 2004 , USA.

[4] Arbab I. Arbab, The past Earth's rotation (**Poster**), International symposium in Earth gravity fields, 24 August-1 September, 2006, Istanbul, Turkey.

[**5**] **Arbab I. Arbab**, Large Scale Quantization and the Puzzling Cosmological Problems (**Talk**), V International Conference on Gravitation and Astrophysics of Asian-Pacific Countries, October 1-7, 2001, Moscow, USSR.

[**6**] **Arbab I. Arbab**, The length of the day in the past (**Talk**), UN/ESA workshop on basic space science, 23-30 June 2000, Toulouse, France.

[**7**] **Arbab I. Arbab**, A model of an accelerating universe (**Poster**), Fifth RESCU international symposium on new trends in theoretical and observational cosmology, 13-16 November 2001, Tokyo, Japan

[**8**] **Arbab I. Arbab**, A model of an accelerating universe, New trends in theoretical and observational cosmology, edited by K. Sato and T. Shiromizu, Universal Acad. Press., 2002, Tokyo, Japan.

[**9**] **Arbab I. Arbab**, Phantom energy with variable G and Lambda (Talk),
4th International Workshop on the Dark Side of the Universe (DSU 2008), Cairo, Egypt, 1-5 Jun 2008 , AIP Conf.Proc.1115:230-238, 2009.

Workshops and Conferences attend/contributed to:

[**0**] Visiting consultant at Sultan Qaboos University, 16 September -12 January, 2012, Muscat, Oman.

[**1**] Visiting consultant at Sultan Qaboos University, 31 January -27 May, 2009, Muscat, Oman.

[**2**] Application of fluid mechanics in Astrophysics, 16 September-15 November, 2007, ICTP, Trieste, Italy.

[**3**] CTP Symposium on Super symmetry at LHC: Theoretical and Experimental Prospective, 11-14 March 2007, Cairo, Egypt.

[**4**] International symposium in Earth gravity fields, 24 August-1 September, 2006, Istanbul, Turkey.

[**5**] Workshop on Geometry and Topology, 14 July- 8 September, 2005, ICTP, Trieste, Italy.

[**6**] Summer School in high energy physics, 18 July- 9 September, 2003, ICTP, Trieste, Italy.

[**7**] Fifth RESCU international symposium on new trends in theoretical and observational cosmology, 13-16 November 2001, Tokyo, Japan

[**8**] Fifth international conference on gravitation and astrophysics of Asians-Pacific countries, 1-7 October 2001, Moscow, Russia.

[**9**] Summer School in high energy physics, 18 June- 9 July, 2001, ICTP, Trieste, Italy.

[**10**] Cairo international conference on high energy physics, 8-14 January 2001, Cairo, Egypt.

[**11**] UN/ESA workshop on basic space science, 23-30 June 2000, Toulouse, France.

[**12**] Summer School in high energy physics, 1999, ICTP, Trieste, Italy.

[**13**] Summer School in high energy physics, 1998, ICTP, Trieste, Italy.

[**14**] Summer School in high energy physics, 1995, ICTP, Trieste, Italy.

[**15**] Summer School in high energy physics, 1994, ICTP, Trieste, Italy.

[**16**] Summer School in high energy physics, 1993, ICTP, Trieste, Italy.

[**17**] Workshop on problem of teaching physics at Sudanese secondary schools, 1989, Khartoum, Sudan.

[**18**] Nile Winter college in high energy physics, 1989, Khartoum, Sudan.

Membership of Academic Societies:

[**1**] Individual member of the Italian physical society, 2009

[**2**] Member of the European Physical Society, 2004, France.

[**3**] Fellow of the Royal Astronomical Society, 2003, UK.

[**4**] Member of the Institute of Physics (IOP), 2002, UK.

[**5**] Charted Physicist of the Institute of Physics, 2002, UK.

[**6**] Junior Associate of the International Center for Theoretical physics (ICTP), 1998, Italy.

[**7**] Regular Associate of the International Center for Theoretical physics (ICTP), 2002, Italy.

[**8**] Associate member of the International Society for the Study of Origin of Life (ISSOL), 1999, USA.

[**9**] Member of the Sudanese Physical Society, 2006, Sudan.

Editorial Experience:

[1] Reviewer in Computers & mathematics with applications, 2012, The Netherlands.

[2] Reviewer of Hadronic Journal. 2012, USA

[3] Reviewer of the**Journal of Basic and Applied Scientific Research (JBASR)**. USA

[**3**] Reviewer of the Journal of Nonlinear Mathematical Physics, 2007, France.

[**4**] Reviewer of the Fizika A & B, 2007, Croatia.

[**5**] Member of the Editorial Board of the Electronic J. of Theoretical Physics, 2005, UAE.

[**6**] Associate Editor and co-founder of the African Physical Review, 2005, Italy.

[**7**] Member of the Editorial Board of the African J. of Mathematical Physics, 2001, Morocco.

[**8**] Reviewer in Astrophysics and Space Science, 2001, the Netherlands.

[**9**] Reviewer in International J. of Theoretical Physics, 2007, USA.

[**10**] Review in General Relativity and Gravitational, 1997, USA.

[**11**] Reviewer in Symmetry in Physics, 2006, France.

[**12**] Reviewer in Proceeding of the Pakistan Academy of Science, 2009, Pakistan.

[**13**] Journal of Al Azhar University-Gaza, 2010, Palestine.

[**14**] Journal of King Saud University (Science), 2010, Saudi Arabia.

[**15**] Physics Essays, American Institute of Physics, 2010, USA.

[**16**] Managing Editor, Sudan Journal of Science, 2010, SUDAN.

[17] Reviewer in Sudan Journal of Science and technology, 2006, Sudan.

Awards and Prizes

[**1**] University of Khartoum Prize in Physics, 1989.

[**2**] Third World Academy of Science Prize in Mathematics for young scientists, Sudan Institute for Natural Sciences, 2002.

[3] Iconic Achievers, International Bibliographical Center, UK.

Published Textbooks:

[**1**] Ordinary differential equations, 2012, LAP LAMBERT Academic Publishing, Germany.

[**2**] Quantum mechanics, 2004, Dar Alrushd Company, Saudi Arabia.

[**3**] Introduction to quantum mechanics, 2006, Al Dar Alalamyia lilnashr, Saudi Arabia.

[**4**] General Physics, 2006, Al Dar Alalamyia lilnashr, Saudi Arabia.

[**5**] Calculus, Sudan Open University Press, 2005.

Academic Experiences:

[**1**] Assistant Professor, University of Khartoum, Department of Physics, 1997-2000.

[**2**] Assistant Professor, Omdurman Ahilia University, Department of Physics, 1999-2002.

[**3**] Associate Professor, Comboni College for Computer Science, 2001-2002.

[**4**] College of Education, Department of Physics, King Saud University, 2002-2006.

[**5**] Assistant Professor, Department of Physics & Mathematics 1996-1997.

[**6**] Teaching Assistant, Department of Physics, University of Khartoum, 1993-1997.

Courses Taught:

[1] General Physics

[2] Mechanics

[3] Sound

[4] Quantum Mechanics

[5] Theory of Relativity

[6] Statistical Physics

[7] Advanced Calculus

[8] Mathematical Methods: Differential Equations, Transforms Integrals, Complex Variables

[9] Modern Physics

[10] Electricity and Magnetism

[11] Optics

[12] Fluid Mechanics