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I S W I
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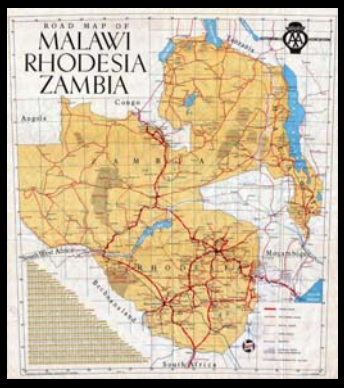
The attached slides were presented by Mr Fred Nambala at a seminar at SERC, Kyushu University, Japan, on 16 June 2011.

Mr Nambala came to SERC for about one month to receive training on MAGDAS. He is a lecturer at the University of Zambia, Lusaka, Zambia.

Facts

- Zambia is in Southern Africa, Africa, Earth, Milky-way Galaxy, Universe
- Has a population of about 13.6 million people according the the 2010 AD Census
- Territory is about 750, 000 km^2
- Has 8 neighbouring countries namely Angola, Botswana, Congo Kinshasa (DRC), Malawi, Mozambique, Namibia, Tanzania, Zimbabwe
- Was once in a Federation called Rhodesia (Northern Rhodesia = Zambia; Southern Rhodesia = Zimbabwe) and Nyasaland (Malawi)



Politics

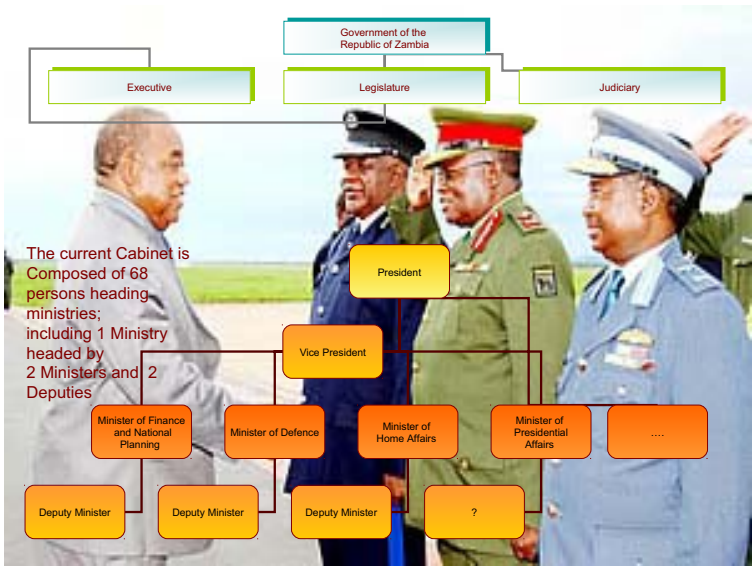
- Since Independence on October 24, 1964, the Nation has had only 4 Presidents
- Started as a multi-party democracy
- 1972, it became a 1 party democracy
- 1990, multi-party democracy again
- Declared a Christian Nation in 1992
- Now there are 3 major out of about 30 political parties namely:
  - Movement for Multi-party Democracy (MMD)
  - Patriotic Front (PF)
  - United Party for National Development (UPND)
- Another one of significance is United National Independence Party (UNIP) was the first to form Government
- The rest are more or less fitting to be called piggy-backs


Dr D. Kenneth Kaunda (1964 – 1991)


Dr Frederick JT Chiluba (1991 – 2001)


Late Dr Levy P Mwanawasa (2001 – 2008)


Mr Rupiah B Banda (Nov. 2008 – Todate)



Zambia – the Real Africa

- Zambia derived its name from the Zambezi river – which is the largest running from the Kalena Hills in North-western Province through to the Indian Ocean
- Initially named Northern Rhodesia as a colony of the Great Britain
- The current name came into effect when the then Northern Rhodesian people obtained **Ind**ependence in 1964 becoming Zambians

Tourism

Economics

- 1 US Dollar ~ 4,800 Zambian Kwacha
- Zambia is about the 7th in this world and 2nd largest producer of Cobalt
- Copper is the main driver of the economy
- Agriculture and Tourism are others though no-where near Copper mining

Escort or Return Welcome

- Activities done
- Both escort and welcome back has huge attendance
- VP, Ministers, Service Chiefs

Industry

Art and Crafts

- People do for a living
- Paints
- Pottery
- Self-taught through practice

Sports

Samuel Matete lifted the Olympic Gold Medal for Zambia in 1991 in the 100*m* hurdles category

- Chipolopolo (Copper bullets) boys has never been to World Cup, caused interesting headlines in the Olympics of 1988, have been 2nd placed in 1972 and 1994 African Cup of Nations
- Chipolopolo won the Regional COSAFA 3 times and were runs up in the last edition
- Amon Simutowe – first and only Sub-Saharan African to become Chess Grand Master

Politics New Culture

Urban Life





UNZA

- The University of Zambia was opened in 1966
- Has about 8 Schools/Faculties: Medicine, Veterinary Medicine, Natural Sciences, Mines, Engineering, Law, Humanities and Social Sciences, Education
- I belong to the School of Natural Sciences under Physics Department

Rural Life

- Heading of cattle
- Raring of chicken, Goats, etc
- Subsistence farming
- Hunting for meat
- Collecting fruits and vegetables
- Tradition clothes making
- Fishing


Physics Dept Members

Name	Teaching course codes	Research field	
Prof. Prem C Jain	P361/ P485,	Energy & Environmental Physics	On leave
Prof. Pan N KALOYEROU	MP 415/ P455/ P452, P351/P332	Quantum foundations and theoretical physics	
Dr. Muhammad M HUSSAIN	P191/192/ P198, P261/ P212, P411/ P412.	(1) Neutron cross-sections (2) Trace element analysis using proton induced x-ray analysis (3) Measurement of radon in Zambian copper mines.	
Dr. Habatwa V MWEENE	P 251/P252, P351/ P332, MP 415/P455/P452	Quantum foundations and theoretical physics	
Dr. Geoffrey MUNYEME	P 251/P252,P231/ P272, P485,	1. Materials Science 2. Energy & Environmental Physics	On leave
Dr. Adrian HABANYAMA	P 251/P252, P421/ P422	Material Science.	On leave
Dr. Sylvester HATWAMBO	P191/192/ P198, P261/ P212, P485,	Energy & Environmental Physics	
Dr. Rekha RAJAN	P231/ P272, P341/P342, P441/P442	1. Electronics 2. Aerosols	
Dr. Kabumbwe HANSINGO	P302/P401	Weather and climate physics	
Dr. Patrick SIBANDA	P361	Space Physics (Ionospheric physics)	New
Mr. Gershom M CHISHIMBA	P191/192/ P198, P411/ P412	Radiation Technology and Waste Management	
Mr. Peter C KALEBWE	P191/192/ P198, P261/ P212, P341/P342, P441/P442.	Applied Radiation Physics	
Mr. Dominic J MBEWE	P231/ P272, P341/P342, P441/P442	Biofuels Production	
Mr. Steven MUDENDA	P 251/P252, P421/ P422.	Material Science.	
Mr. Fred Joe NAMBALA	P 251/P252, P485.	Space Physics (Ionospheric tomography).	New
Mr. Nchimunya MWIINGA	P231/ P272, P361/P485	PhD student in Space Physics (i.e. heliospheric physics) – NWU, South Africa.	

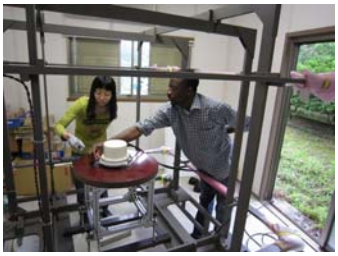
Culture


- Traditional Ceremonies:
- Kuomboka
- Lwiindi
- Mutomboko
- Nc'wala

Calibration

Adjusting stage

Adjusting sensor



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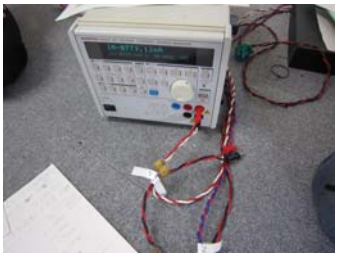
Apart from the above list of Lecturing staff, the Physics Department though University policy programme has the following Staff Development Fellows

Below is a list of UNZA's SDFs (i.e. Staff Development Fellows) in physics		
Name	**Field of Interest**	**Status**
Ms. Lister MULINDWA	Condensed Matter	PhD student - Canada
Mr. Geoffrey CHANDA	Supper Conductors	PhD student – Germany.
Mr. Michael MWALABA	Condensed Matter	Has a Pre-PhD Diploma from ICTP, Italy – looking for PhD scholarships.
Mr. Nathan PUMULO	Quantum Information	Recently completed M.Sc. at UKZN, South Africa
Mr. Nyambe WAMUNYIMA	Quantum Information	M.Sc. student - UKZN
Mr. Bernard MULILO	Nuclear Physics	M.Sc. student – South Korea
Mr. Gift SICHONE		Soon leaving for M.Sc. in China.
Mr. Mark SHAWA		Looking for M.Sc. and PhD scholarships
Mr. Shupe SIAME		Looking for M.Sc. and PhD scholarships
Mr. Vernon CHISAPI	Nuclear Physics	Looking for M.Sc. and PhD scholarships

Calibration

Setting Sensor

Current source for Helmoholtz Coil



SERC - MAGDAS Trip

Starting of winding

Progress of winding

Coil Constant Expt

Coil in Vertical position

Recording results

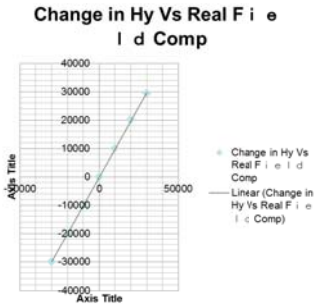
Installations and Coil building

MAG 9 Installations

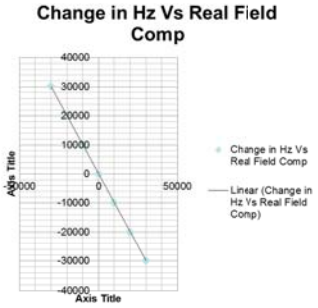
Coil Winding

H, D and Z components

Hy Results



Hz Results



Coil Constant expt

Inclination change

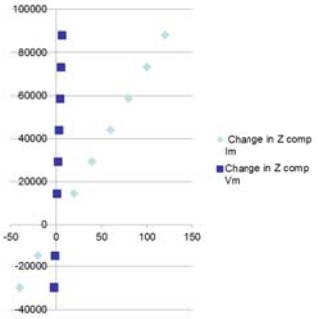
Readings from Monitor

Coil Constant Calcuation

Values recorded

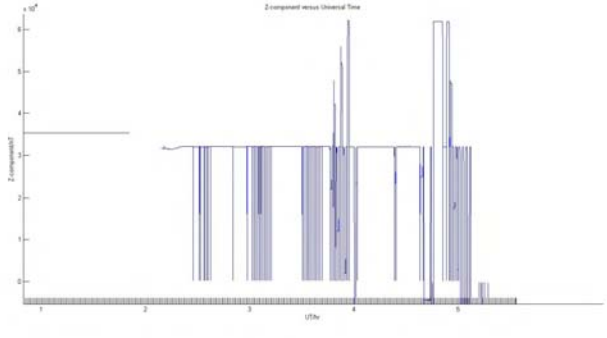
△HZ (nT)	Observed Field	Im (mA)	Vm (Volts)
-29856.2	61856.24	-40.05	-2.25
-15084.3	47144	-20.06	-1.139
14352.5	17707.19	19.962	1.084
29101.22	2957.83	39.49	2.197
43820.46	-11761.6	60	3.31
58530.79	-26471	79.99	4.42
73248.88	-41190.9	99.99	5.53
87978.9	-55928.1	120.04	6.64

Change in Hz Vs Im/Vm



Mag 9 No. 25 returning

MAG 9 Data plot



H, D and Z Components

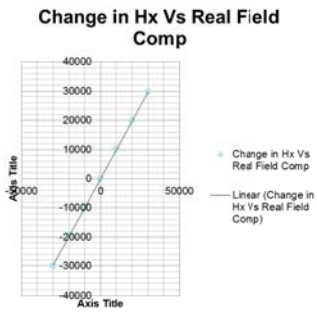
Data Collected

X component Field putting through current source

12:00 Hr steps of 1minute interval

Real Field	Im (mA)	HX (nT)	△HX (nT)	C. Const * Im	Ratio
0	500.02	28675.05		19253.27	0
10000	259.74	38696.97	10021.92	10001.29	1.002063
0	259.74	28676.5	-10020.5	10001.29	-1.00192
-10000	259.74	18618.1	-10058.4	10001.29	-1.00571
0	259.74	28871.11	10253.01	10001.29	1.025169
20000	519.4	48732.76	19861.65	19999.5	0.993107
0	519.4	28056.13	-20676.6	19999.5	-1.03386
-20000	519.4	8579.21	-19476.9	19999.5	-0.97387
0	519.4	28911.13	20331.92	19999.5	1.016622
30000	779.04	58769.19	29858.06	29996.94	0.99537
0	779.04	28456.54	-30312.7	29996.94	-1.01052
-30000	779.04	-1453.07	-29909.6	29996.94	-0.99709
0	779.04	28456.54	29909.61	29996.94	0.997089

Analysis



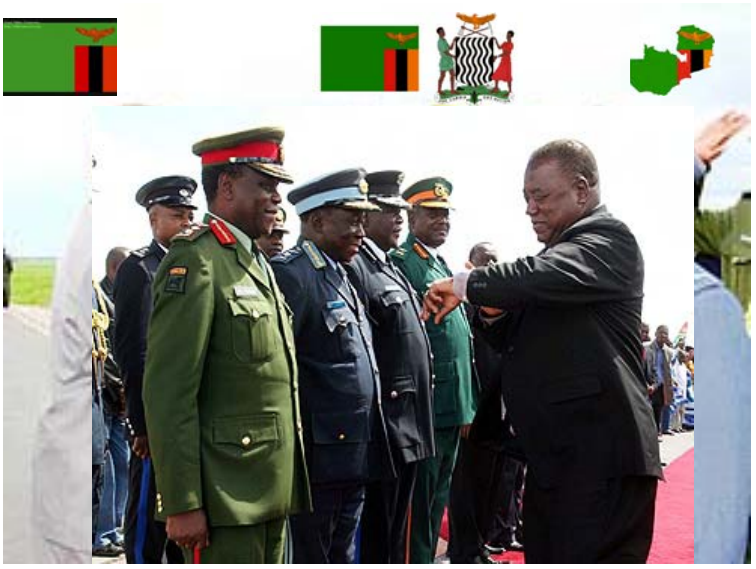
Calibration Coil Constant

Calibration Helmoholtz Coil Constants

- With 2A current source of X, Y and Z components
- 77010 nT in X
- 83897 nT in Y
- 71450 nT in Z

Coil Constants

- 13249.74 nT/V
- 7353.94 nT/mA
- Or 735393.98 nT/A



Thank you for your invitation and attention

ARIGATO, GOZAIMASU