AfLS Conceptual Design Report

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"The True Size of Africa"
Generated by Kai Krause (graphic designer)
http://kai.sub.blue/en/africa.html

THE AFRICAN LIGHTSOURCE

Towards a Lightsource for the African Continent

http://www.africanlightsource.org/organizational-chart/afls-executive-committee/

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Grenoble Resolutions towards the African Light Source (http://events.saip.org.za/conferenceDisplay.py/getPic?picId=70&confId=61)

1. Advanced light sources are the most transformative scientific instruments similar to the invention of conventional lasers and computers.

2. Advanced light sources are revolutionizing a myriad of fundamental and applied sciences, including agriculture, biology, biomedicine, chemistry, climate and environmental eco-systems science, energy, engineering, geology, heritage studies, materials science, nanotechnology, paleontology, pharmaceutical discoveries, physics, with an accompanying impact on sustainable industry.

3. The community of researchers around the world are striving collaboratively to construct ever more intense sources of electromagnetic radiation, specifically derived from synchrotron light sources and X-ray free-electron lasers (XFELs), to address the most challenging questions in living and condensed matter sciences.

4. The African Light Source is expected to contribute significantly to the African Science Renaissance, the return of the African Science Diaspora, the enhancement of University Education, the training of a new generation of young researchers, the growth of competitive African industries, and the advancement of research that addresses issues, challenges and concerns relevant to Africa.

5. For African countries to take control of their destinies and become major players in the international community, it is inevitable that a light source must begin construction somewhere on the African continent in the near future, which will promote peace and collaborations among African nations and the wider global community.

CDR Committee (formed January 2020)

Riccardo	Bartolini	Diamond Light Source
Muaaz	Bhamjee	Univ. of Johannesburg
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George	Clerk	
Simon	Connell	Univ. of Johannesburg
Joseph	Daafuor	Univ. of Ghana- Legon
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Benson	Frimpong	Univ. of Ghana- Legon
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Samuel	Sloetjes	Uppsala University
Herman	Winick	SLAC - Stanford University (retired)

THE AFRICAN LIGHTSOURCE

Towards a Lightsource for the African Continent

http://www.africanlightsource.org/afls-roadmap-cdr/

4 Volumes (Editor: Sekazi Mtingwa)
Volume I. Scientific, Socio-Economic, Educational and Political Benefits (Sub-editor :Marcus Newton)

Volume II. Machine Design Concepts (Sub-editor : Dorian Bohler*, Riccardo Bartolini, Christine Darve)

Volume III. Scientific Capabilities and Beamline Technical Concepts (Sub-editor : Kenneth Evans-Lutterodt*)

Volume IV. Technical Infrastructure and Building Design (Sub-editor :Simon Connell*, Rudolf Dimper , Nathaniel Reed-Yehuda)

Volume V. Multinational Project Finance and Governance Concepts (Sub-editor: Jean-Pierre Ezin, Connie McNeely, Simon Connell, Aba Andam, Paul Woafo)

“Big” Science

Institution

PI

Scholars/ Trainees

$40-80M

(construction)

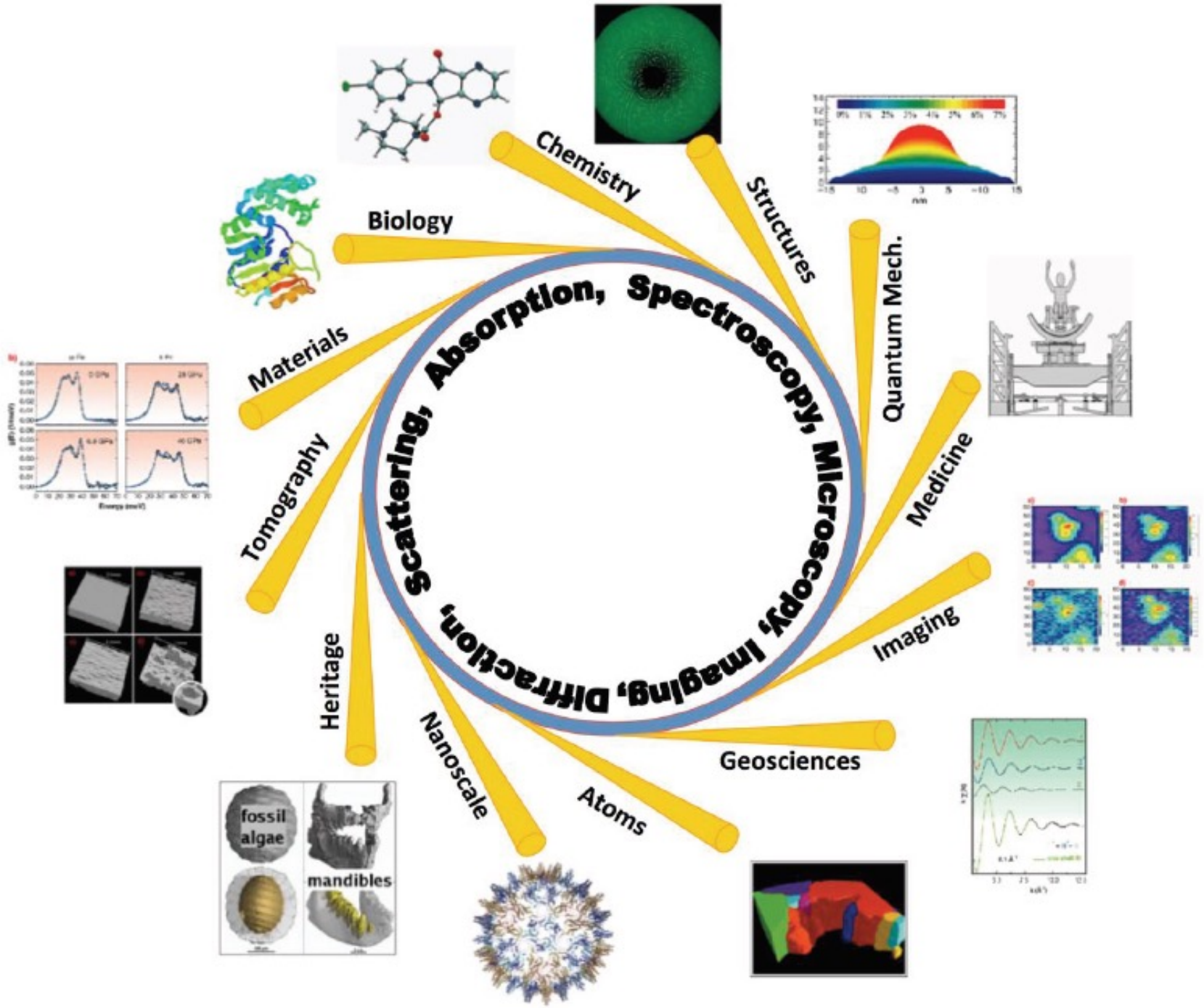
Cost: $90-150M
(construction– depending on size & capabilities)

Where: Somewhere on the continent of Africa

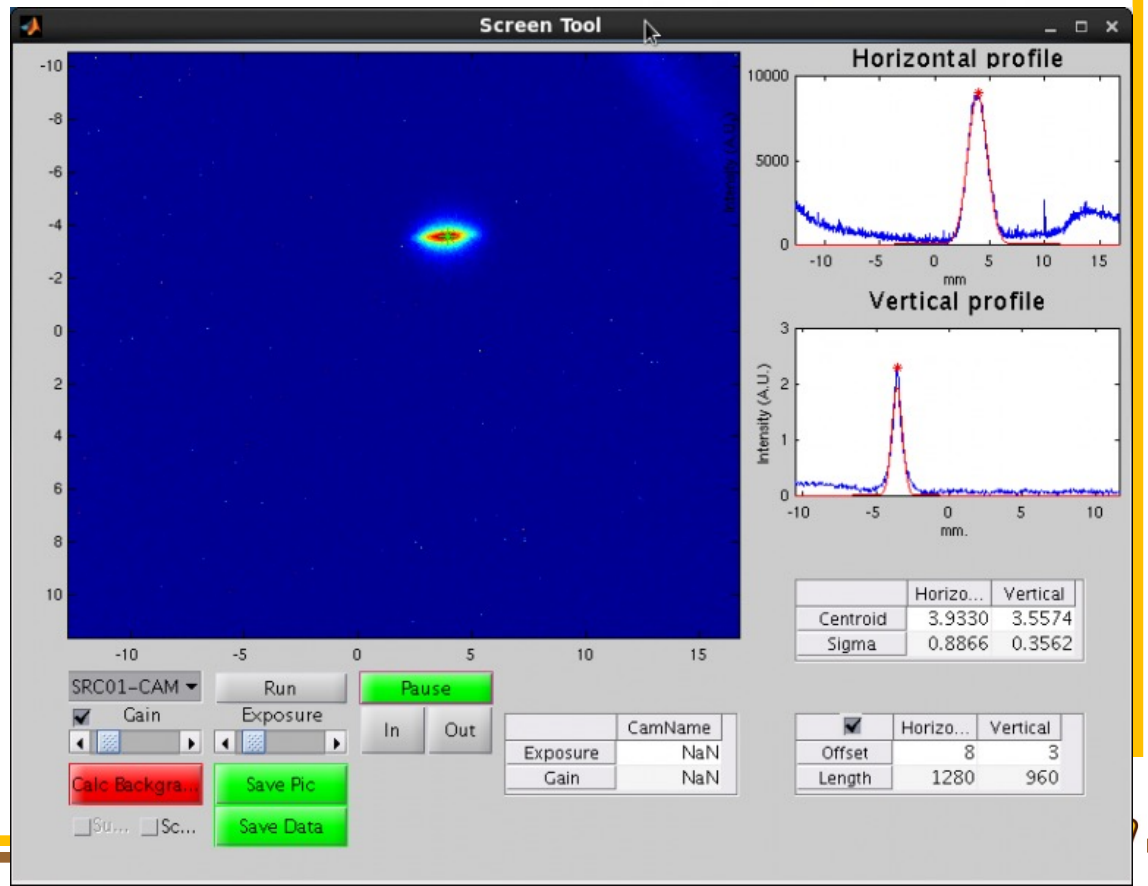
When: Near term future

How and Why: Subject of this presentation

Light sources around the world


Scattering, Absorption, Spectroscopy, Microscopy, Imaging, Diffraction,
Chemistry
Structures
Quantum Mech.
Medicine
Imaging
Geosciences
Atoms
Nanoscale
Heritage
Tomography
Materials
Biology
fossil algae
mandibles

Science as a tool for Diplomacy



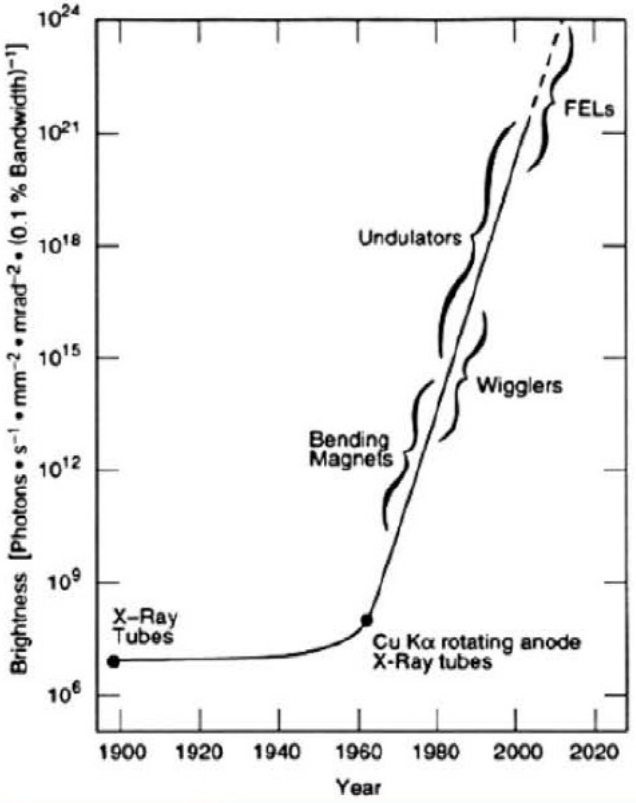
The African Light Source Project

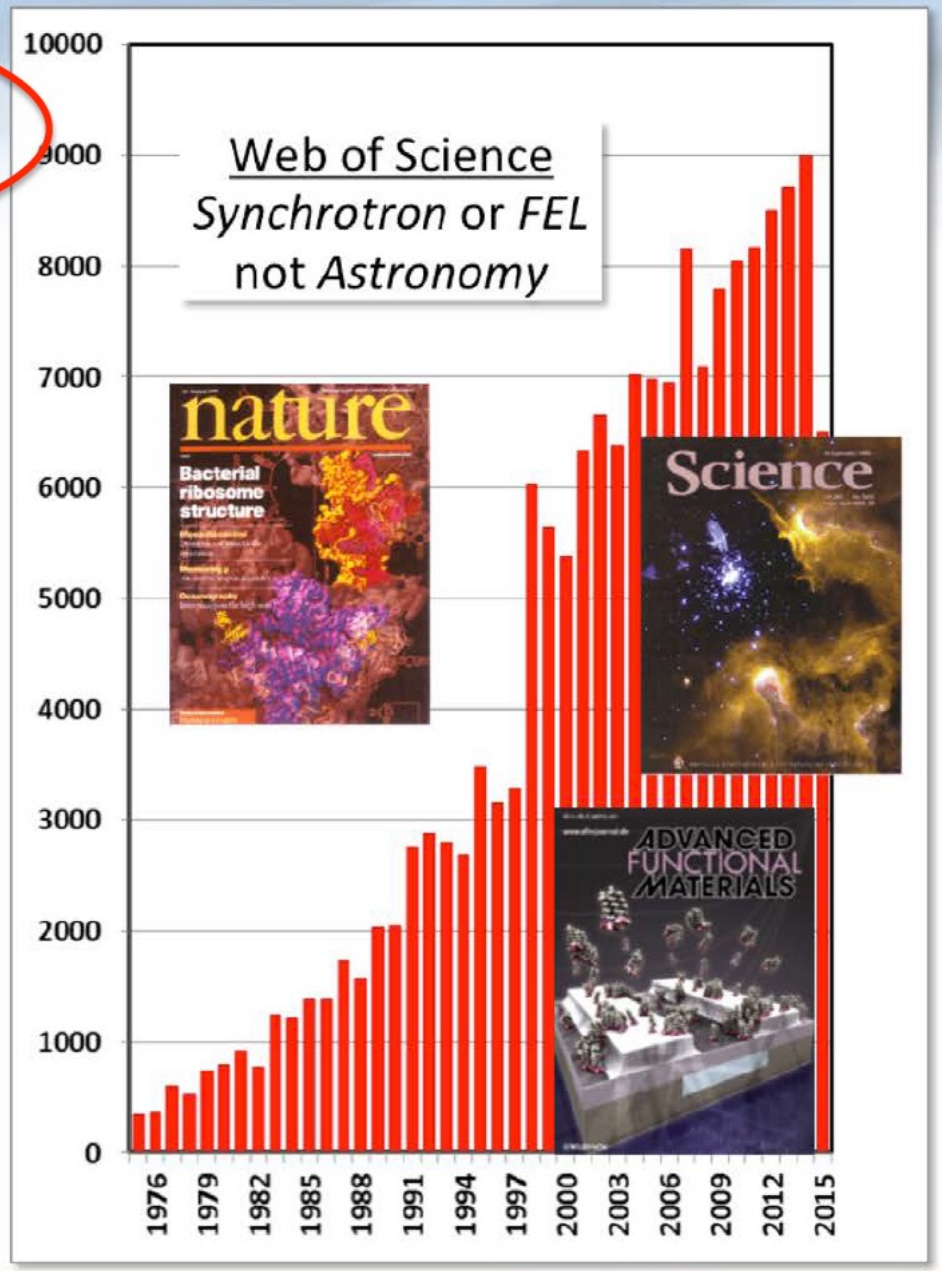
Socio-economic benefits

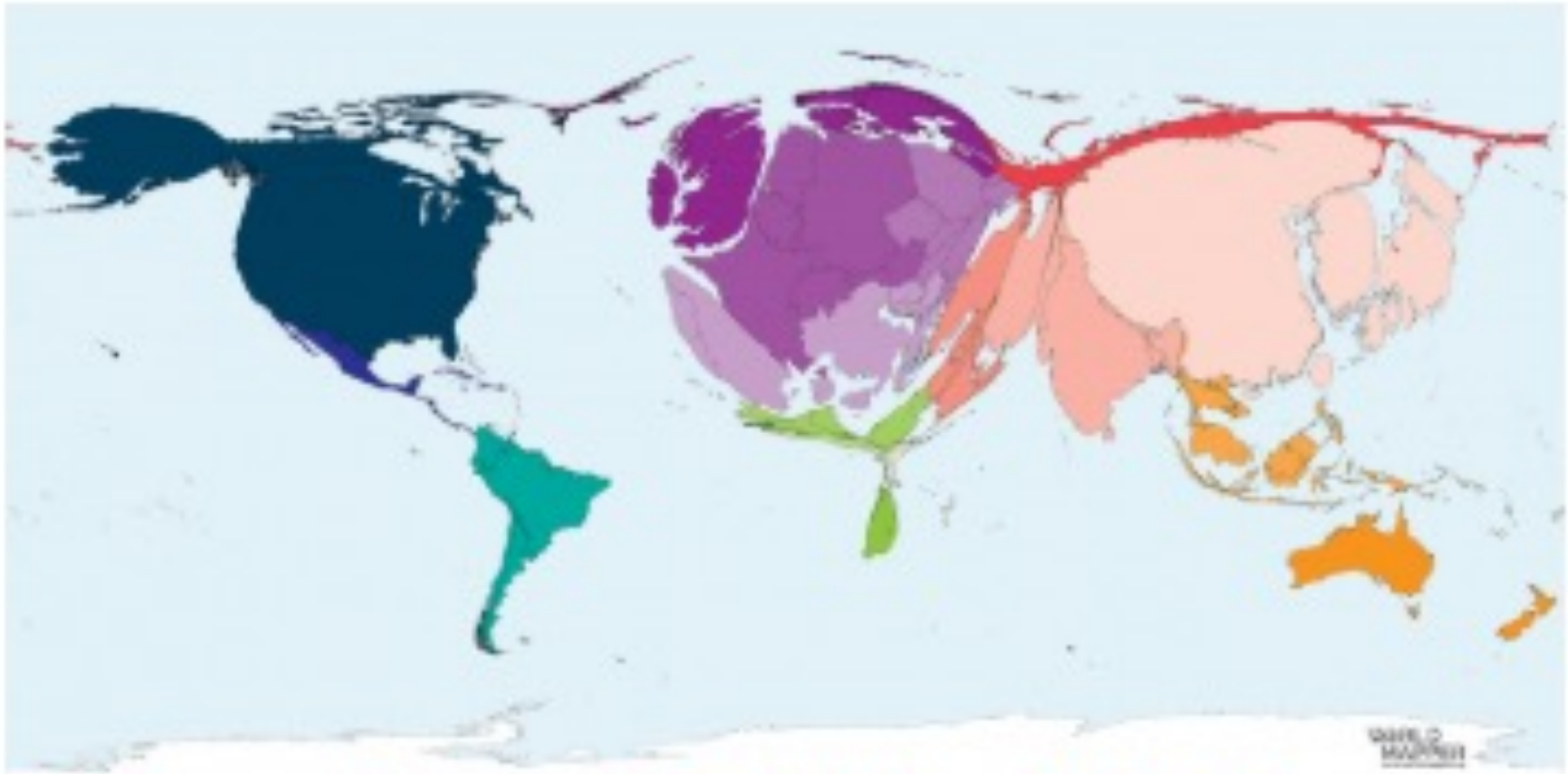
- Boost African Scientific Research, Research Capacity (Continent, regions, Institutes), Capacity Building - African Science Renaissance
- Global Research Community
- Tackling Diseases (Malaria, TB, Aids, Ebola ....)
- Unique African Research Opportunities attracting international collaboration : Energy opportunities, African Environment, Cradle of Humankind, Cradle of Culture, Mineral beneficiation, Agriculture.
- Mobility, Conferences, Schools, International Mentoring partnerships in student training, Regional Centres of Excellence, Local feeder instrumentation
- Build Research capacity in Industry, competitive industry
- **Science for Peace (eg SESAME – discussed this week)**
- Return of the African Science Diaspora - new opportunities for young excellent scientists
- For African countries to take control of their destinies and become major players in the international

Growth in Synchrotron Science

- Steady growth in past four decades – big jump in late 1990's fueled by 3rd-SRs







Science Papers Published 2016

https://worldmapper.org

Thank You.

African Light Source
AfricanLightSource.org
@AfSynchrotron

The African Review of Physics (2018) **13**: 0019

The African Light Source Project

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COMMENTARY

Check for updates

Towards an African Light Source

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Introduction

An advanced light source (AdLS) presents itself as the most important scientific investment that Africa could construct at this infrastructure must be both multi- and inter-disciplinary. The obvious candidate is the AdLS (LAAAMP 2018). Many have asked whether Africa is ready for such a technologically sophisticated large-scale scientific infrastructure. The answer is YES.

and longer term and has a large impact on ılightenment, the eradication of ignorance and ıdamental appreciation of all diversity. In this