

The Need for an African Synchrotron Light Source

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Time is moving. Both developed and some developing regions of the world are moving ahead rapidly in scientific discoveries and innovations. No one instrument is playing any greater role than the approximately 50 synchrotron light sources (SLSs) spread around the world. Together with X-ray Free-Electron Lasers (XFEL), they comprise a category of instrumentations called Advanced Light Sources (AdLS). Since synchrotron light sources allow many experiments to be performed simultaneously in many different disciplines, even greater than 50 at a time, they would be more important for Africa than an XFEL, which limits the number of simultaneous experiments to on the order of five.

There is no better way for Africa to meet its challenges and keep up with the rest of the world than to construct its own SLS somewhere on the continent. Indeed, locating it somewhere would greatly benefit everywhere in Africa. Along those lines, I need only quote the *Grenoble Resolutions*, which were issued in 2015 during the 1st African Light Source Conference and Workshop at the European Synchrotron Radiation Facility (ESRF) in Grenoble. They are as follows:

- 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 ecosystems science, cultural heritage studies, energy, engineering, geology, materials science, nanotechnology, palaeontology, pharmaceutical discoveries, and 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.*

Given the veracity of these resolutions, it is absolutely imperative for African nations to pool their resources and construct a synchrotron light source as a Pan-African scientific and technological investment as quickly as possible.