Last week, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority, and Turkey, as well as other nations and international organizations, gathered in Jordan to inaugurate the Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) project. Having persevered through two decades of political and financial challenges, this complex machine is poised to run its first experiments this year. Indeed, SESAME represents the power of science in bringing together countries—even those with frayed relations—under a common goal of advancing knowledge for the benefit of all humankind. The triumph of SESAME, and the outpouring of research results from other light sources around the world, have spurred interest in building synchrotrons in developing countries.

Synchrotron light sources have revolutionized basic and applied research. At a facility such as SESAME, electrons are accelerated and injected into a storage ring, producing light over a broad spectral range with intensity a million times greater than that of conventional sources. This light source can elucidate the structure and properties of matter, with applications in physics, materials science, biology, and medical imaging. More than 50 synchrotron light sources are in operation worldwide, including in Brazil, South Korea, and Taiwan, countries that started their programs in the 1980s before becoming economic and scientific powerhouses. Their synchrotrons have trained hundreds of graduate students and attracted diaspora scientists to return. Growth in user communities has led to new higher-performance light sources in these countries.

SESAME began in 1997 with a suggestion by one of us (H.W.) that the 0.8-GeV BESSY I light source in Berlin should be sent to the Middle East, where it could serve in a new facility. Originally under the United Nations Educational, Scientific and Cultural Organization (UNESCO) and modeled after the European Organization for Nuclear Research (CERN), the SESAME Council was eventually formed and assumed governance over the project. As the large potential user community in the Middle East became clearer, SESAME evolved into a third-generation, 2.5-GeV light source.

Despite political and funding obstacles, and a roof collapse by unprecedented snowfall, nations and organizations rallied to see SESAME succeed through leadership by former CERN directors-general and support from Jordan, CERN, the European Union, the International Atomic Energy Agency, Italy, and the Japan Society for the Promotion of Science. Other synchrotron light sources allowed Middle East scientists to gain experience at their facilities during SESAME’s construction.

UNESCO described SESAME as a quintessential project, “combining capacity building with vital peace-building through science” and “a model project for other regions.” Today, Iran, Turkey, and Pakistan are considering national light sources. Mexico is planning one, and Africa—the only habitable continent without a light source—has proposed the African Light Source, with global enthusiasm. As well, the Light sources for Africa, the Americas and Middle East Project (LAAMP) was launched by the International Union of Pure and Applied Physics, the International Union of Crystallography, and other partners with a 300,000 Euro grant from the International Council for Science to enhance light source and crystallographic science in these regions.

These new endeavors will face challenges. But they share with SESAME the goals of building regional capacity and promoting understanding, friendship, and peace by bringing together scientists from different countries and ethnicities to perform world-class science.

—Sekazi K. Mtingwa and Herman Winick

Sekazi K. Mtingwa is a principal consultant at Triangle Science, Education & Economic Development, LLC, Hillsborough, NC, USA. sekazi.mtingwa@gmail.com

Herman Winick is professor emeritus at the SLAC National Accelerator Laboratory, Menlo Park, CA, USA, and at the Applied Physics Department, Stanford University, Stanford, CA, USA. winick@slac.stanford.edu

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SESAME and beyond
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