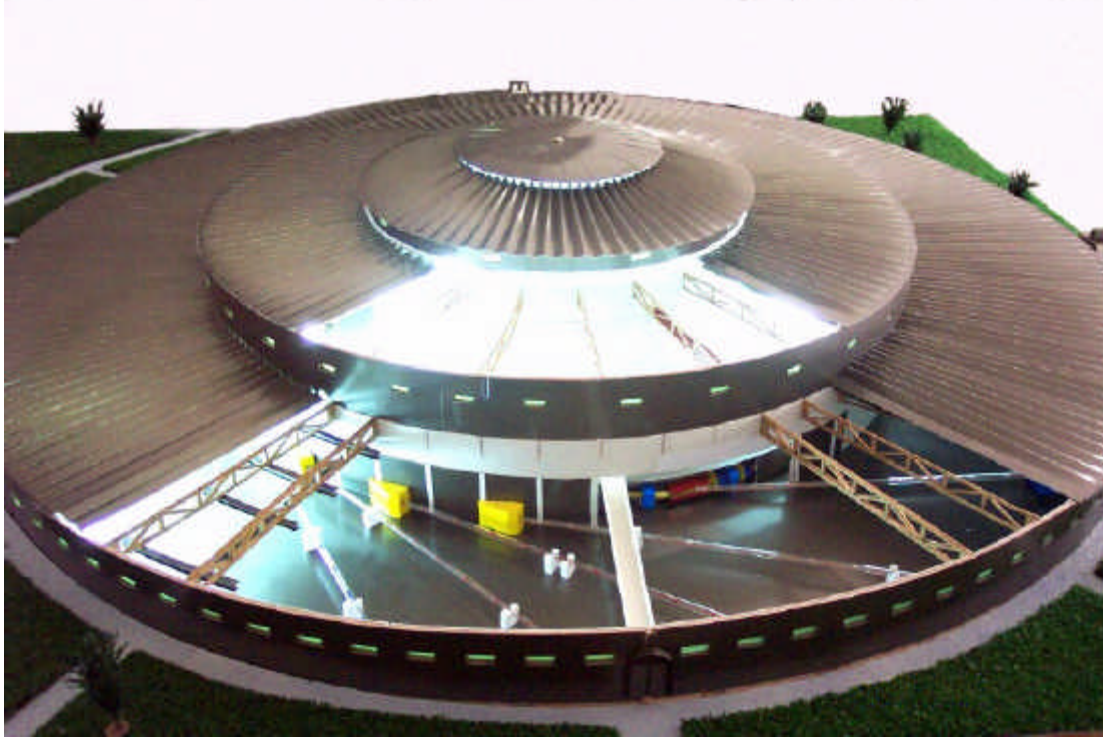


CANDLE – NEW PERSPECTIVES

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In August 2002 the Experts Panel of the US State Department gave a favorable review to the CANDLE synchrotron light source project developed by Armenian scientists. The project was recognized as a world-class project being unique within the radius of 2000 km. The realization of this \$48 mln cost project, funding of which is expected from non-budgetary sources, is passed to the prototyping stage of main accelerator components and the scientific program development.



The need to study in detail the multiplicity of living matter on cellular and subcellular levels, the formation mechanisms of complex molecular substances and the variety of atomic structures in 90s made synchrotron radiation (SR), achieved in accelerators, as an ideal tool for these researches. The brightness of SR is trillion times as large as the one of conventional sources. A number of dedicated accelerators were constructed among the major ones are ESRF in Europe, SPRING 8 in Japan and APS in the USA. The development of new light sources for applied research became a priority program for the world leading high energy physics laboratories as SLAC in the USA and DESY in Germany. Distinguished scientists in the fundamental physics lead the creation of new SR centers. The Nobel Prize winner Carlo Rubbia initiated the ELETTRA project in Italy, the other Nobel Prize winner Georges Charpak – SOLEIL project in France. Famous American physicist **professor Alexander Abashian**, co-author of one of fundamental discoveries in XX century “CP violation in weak interactions”, became the director of the CANDLE project.

Nowadays over 40 SR centers are operating in the world, mostly located in the USA, Western Europe and Japan. The annual spin-off from their exploitation worldwide is estimated at the level of hundreds of billion dollars. The fields of application cover chemistry, medicine, biology, physics, new drugs design, nanoelectronics and microfabrication, monitoring of oilfields and environment, cosmetics, biotechnology, telecommunication, radioactive wastes treatment, development of new materials, AIDS ... Almost all foremost companies in microelectronics, pharmaceuticals, biotechnology, cosmetics and other fields spends much on research with SR usage. The investigations by L’Oreal in cosmetics, Bayer in pharmacology, Intel and IBM in microelectronics, Chevron in petroleum industry became a usual thing.

The increasing demand of investigations with SR application far exceeds the possessed capabilities. As an example, only in structural biology the world demand tenfold as large as the supply. It is not occasionally, that the DIAMOND project in England is called the locomotive for country industry in XXI century. The SOLEIL project in France is of the same merit. The CANDLE impact on the development of our country will be more significant taking into consideration the huge difference in the economic levels of Armenia and the developed countries.

It is well known, that the realization of the country intellectual potential is strongly depend on the right choice of scientific priorities. It is a complicated and not-trivial task even for developed countries. In the opinion of experts, the creation of modern SR source in Armenia will hold the scientific investigations here at the frontier and will open a long-term perspective for the broad range of fundamental and applied disciplines. Only those research proposals improved by the international review committee will be carried out together with the scientists from leading research centers. Armenia will develop into one of the cutting-edge centers of science and will head for a long-term science-oriented development program. The young scientists will be employed in their home country. When fully operational CANDLE will serve the research groups with over 60 beamlines, most of which will be called for long before the launching of the main accelerator.

Already in the beginning of April the French delegation will visit CANDLE to adjust two SR beamlines at the future facility and to develop the long term cooperative research programs between French and Armenian institutions in the fields of material and life sciences.

The direct impact on the economy and education from the construction of the new center is also of crucial importance. About 60% of components – the modern electrophysical equipment – will be manufactured in Armenia in cooperation with foreign companies. That will move the Armenian industry on the contemporary lines of instrumentation and integration into the world economy, the engineering-technical potential of the country will be restored. **The prototype of the magnet for the new accelerator is already under the fabrication in “Armeektromash” company.**

CANDLE project involves advanced achievements in the fields of ultravacuum technique, powerful high-frequency generators, ultra-short pulse systems, high-resolution detectors, etc. In its parameters this equipment exceeds by thousands and millions order over the ones existing in Armenia.

After the accelerator is launched, the kind of technologies will develop here that are currently available in developed countries possessing SR sources. That includes nanotechnologies, functional devices in microns level, which have wide applications in medicine, space industry, telecommunications. The determination of protein structures and the design of new drugs will make the ground for the growth of biotechnology and pharmacology in the republic. The operation of CANDLE will increase the diagnostics level of many diseases to a great extent.

The important stage of project design and its scientific-technical expertise is successfully over. More than 80 scientific proposals to be conducted at CANDLE were received. Long-term cooperation agreements are signed with leading foreign laboratories. There arises a real opportunity for turning the science from expense sphere into cost-effective. Thousands of foreign users and companies will input considerable funds. How to make the most efficient use of this historical chance? That's the question which should be met CANDLE together with the Armenian Government, scientific community and the Diaspora.

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