Introduction

A synchrotron is a source of brilliant light that scientists can use to gather information about the structural and chemical properties of materials at the molecular level.

A synchrotron produces the light by using powerful electro-magnets and radio frequency waves to accelerate electrons to nearly the speed of light. Energy is added to the electrons as they accelerate so that, when the magnets alter their course, they naturally emit a very brilliant, highly focused light. Different spectra of light, such as Infrared, Ultraviolet, and X-rays, are directed down beamlines where researchers choose the desired wavelength to study their samples. The researchers observe the interaction between the light and the matter in their sample at the endstations (small laboratories).

This tool can be used to probe the matter and analyze a host of physical, chemical, geological, and biological processes. Information obtained by scientists can be used to help design new drugs, examine the structure of surfaces to develop more effective motor oils, build smaller, more powerful computer chips, develop new materials for safer medical implants, and help with clean-up of mining wastes, to name just a few applications.

Quick Facts:

- More than 40 synchrotron light sources have been built around the world. The Canadian synchrotron is competitive with the brightest facilities in Japan, the U.S. and Europe.
- As of 2009, more than 2000 scientists have used the CLS.
- More than 3,000 academic, industrial, and government researchers a year from across Canada and from other countries are expected to use the facility once the full complement of beamlines is developed. Beamlines carry the synchrotron light to scientific work stations capable of operating 24 hours per day, 7 days per week, approximately 42 weeks of the year.
- Initially, the CLS will focus on research in three key areas:
    - mining, natural resources and the environment
    - advanced materials, information technologies and micro systems
    - biotechnology, pharmaceuticals and medicine
- The first synchrotrons were additions to facilities built to study subatomic physics. Synchrotron light was an annoyance to the researchers because it meant their electron beams lost energy every time they went through a bending magnet. However, the remarkable qualities of this light were soon recognized, and researchers began to come up with ways to use it.

Currently, CLSI has more than 130 employees. The work force of scientists, engineers, technicians, and administrators is growing to match additional CLSI users. Located in the midst of a research cluster on the north end of the University of Saskatchewan, next to Innovation Place, one of Canada's leading high-tech industrial parks, CLSI strengthens Saskatoon's reputation as "Science City" as a much-needed national R&D facility.