CBB Partners

Project Areas

THEORY
New methods are suggested by theory and simulation

IMPLEMENTATION
Guided by theory, materials are grown and ideas are developed

CHARACTERIZATION
Materials are characterized to determine properties

TESTS
New methods are tested under beam conditions

APPLICATIONS
New methods are implemented in working accelerators

Convergence Research & How We're Connected

CBB's brighter beams will advance the frontiers of physics, chemistry, materials science, biology, industry, and medicine.

CBB partners work together in **project areas** from theory to application, driven by the Center's **objectives**. This convergence research benefits a wide range of accelerator **applications**.

Objectives

BEAM PRODUCTION

Photocathodes that produce100x brighter electron beams

- **High peak intensity, low MTE photocathodes**
- **Photocathodes for harsh conditions**
- **Nanostructured photoemitters**

BEAM ACCELERATION

Methods for high performance superconducting RF accelerating cavities

- **Advanced materials for cavities**
- **Multilayers and inhomogeneous layers**
- **Demonstrations and extreme conditions**

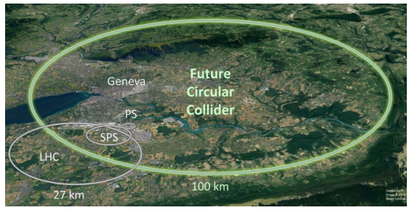
BEAM DYNAMICS AND CONTROL

Methods to conserve, cool and control beams

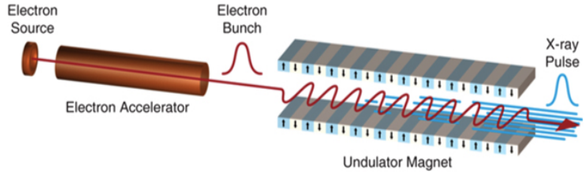
- **Brightness conservation from bright sources**
- **New approaches to Beam Cooling**
- **Advanced optimization schemes**

Applications

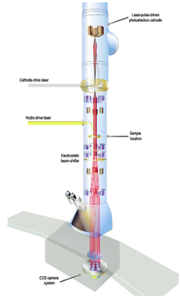
Colliders with higher luminosity and cheaper acceleration =
Expanded scientific reach



X-ray FELs with brighter electron beams =
Lower cost and/or higher energy X-rays



Electron microscopy and ultrafast electron diffraction with online tuning =
Imaging at the atomic scale with unprecedented spatial and temporal resolution



New SRF accelerators =
Innovation in the semiconductor industry, new green technologies, and a beam in every basement