

Chapter 4: Innovating Accelerator Technologies for Society

Messages transmitted

- ▶ There is a strong **relation between science and technology**. Technological breakthroughs in high energy physics are driven by the demands of particle physics
- ▶ Fundamental research has a cost for society: what can it bring back not only in terms of basic knowledge, but also in terms of **technology capable of addressing problems of society**. Examples of **accelerator technology used by society**:
 - ▶ Medical applications for diagnostic and for therapy, archaeology for non-destructive analysis of objects of cultural heritage, food-chain to kill bacteria, climate change, archaeology and art
 - ▶ **Case studies**: superconducting magnets (→ MRI, NMR) and RF (→ X-rays: biology, pharmaceutical and chemical science, energy); climate change; human culture; art and cultural preservation
- ▶ Development of a **new technology** implies **innovation**:
 - ▶ Which is the **genesis of a ground-breaking technology** in large science projects (from the idea to the final industrialization – R&D and prototype phases);
 - ▶ Which are the **challenges that have to be addressed in large science projects**: technical aspects, contracts with industry, collaborations with industry and universities, human aspects (including multi-ethnic environment);
 - ▶ **Case study**: superconducting electrical transmissions (MgB₂ and REBCO) for HL-LHC. Potential applications for society

Chapter 4: Summary Status

- ▶ Our estimate of current level of completion: 85%
- ▶ The following additions/revisions will be completed by July 31st
 - ▶ Revision of conclusions
 - ▶ Some short text will be added to better homogenise the content of the chapter
 - ▶ References – available - will be added