

Preface

This document presents the concept for a major international research facility in the areas of science concerned with the basic structure of matter. The concept is based on extensive discussions about future research opportunities between GSI Darmstadt, the universities and the various international user communities. It also builds on the priority recommendations made over recent years by various high-level science committees worldwide that have reviewed the areas of research addressed by this facility.

The GSI laboratory was founded more than 30 years ago through the efforts of scientists from the nearby universities. The goal of the founding fathers was to combine efforts and resources, and to create a forefront research facility for nuclear physics and related areas. They proposed the construction of a novel heavy-ion accelerator that would exceed the technical capabilities of a single university. The success of the concept and the strong involvement from universities, first from Germany, but soon from most of Europe and worldwide, widened the scope of the facility. Together with a significant energy upgrade about 15 years ago, the facility has evolved into a major international research center using beams of heavy ions.

The proposed new facility builds on this tradition. The principal goal is to provide the European and international science communities with a worldwide unique and technically innovative accelerator system for future research. The facility takes into account the broadened scope of the physics of the strong interaction and related areas in the fundamental many-body systems of matter. It builds technically on unique methods of preparing high-quality beams, several of which have been developed over the recent years at the existing GSI facility. It expands the science scope by generating intense secondary beams of rare, short-lived nuclei and of anti-matter particles, antiprotons. While broadening the science scope, key aspects are uniqueness and complementarity to other facilities, and focus on those features where the facility is unparalleled in its capabilities.

The document begins with an extended Executive Summary, which is also intended for use as a stand-alone document.

Many colleagues have contributed to this document and its contents. At the end of each chapter and at the end of the full report, an attempt is made to recognize all of those who have made contributions in one form or another. But we would like to take the opportunity already here to express our sincerest thanks to everyone involved.



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