

## Workshop on a research program at the future facility at GSI to study superdense baryonic matter –

Dear Colleagues,

GSI has presented plans for a major new International Accelerator Facility for Beams of Ions and Antiprotons which will provide unique research opportunities in the fields of nuclear, hadron and plasma physics. The Conceptual Design Report of the project (see <http://www.gsi.de/GSI-Future/cdr/>) has been submitted and received very positive response from the science community. Presently, the proposal is being evaluated by the highest Scientific Advisory Committee (Wissenschaftsrat) of the German federal parliament (Bundestag). The results of the evaluation will be published in summer 2002. We expect that the political decision will be taken in 2003. According to our schedule, the experimental program should start in 2010.

The planned accelerator will deliver primary beams (protons up to 60 GeV, Uranium up to 23 GeV/u) and secondary beams (rare isotopes and antiprotons) with high intensity and quality. The research program includes the study of nuclei far from stability, hadron spectroscopy, the study of compressed nuclear matter, the investigation of plasmas induced by ion and laser beams and atomic physics. The future facility comprises a double-ring synchrotron, rings for accumulation, cooling and storage of primary and secondary beams, and dedicated detector arrangements. The total cost of the facility amounts to 675 MEuro.

The goal of the proposed heavy-ion collision program is to explore the phase diagram of strongly interacting matter in the region of the highest baryon densities. This research program is complementary to the activities at RHIC (Brookhaven) and ALICE (CERN-LHC) which concentrate on the region of high temperatures and very low baryon densities. The key observables for the study of superdense baryonic matter will be:

- short lived vector mesons decaying into electron-positron pairs (penetrating probes)
- hidden and open charm (charmonium, D mesons)
- multistrange hyperons
- collective flow of hadrons

The detector system should be a universal instrument measuring hadrons and electrons with large acceptance. Particular technological challenges are the operation of detectors at very high particle intensities and the handling of very high data rates. The realization of the planned experiment will be a major international effort in future heavy-ion physics.

We plan to organize a workshop in the near future to continue the discussion of our project on a broad basis. The workshop should cover, among others, the following topics:

1. Theory status reports on the properties of superdense baryonic matter, neutron stars, hadrons in dense matter, ...

2. Detector concepts and technologies applicable for high rates, high granularity, fast read out and large scales, in particular:

- Radiation-hard silicon pixel/strip detectors
- Ring Imaging Cherenkov (RICH) detectors,
- Transition Radiation Detectors (TRD)
- Resistive Plate Chambers (RPC)
- Diamond detectors

3. High rate data acquisition

4. Simulations, feasibility and performance studies

Comments and further suggestions will be highly appreciated. Please make proposals for speakers and additional subjects. The workshop is meant to discuss the physics goals and to review modern detector concepts in order to find the appropriate technical solutions for our needs. Last but not least, the workshop is an important step towards the foundation of an international collaboration. A tentative date for the workshop is May 8.-10., 2002.

We ask for your participation and your contributions. Please inform your colleagues who might be interested in the project. There will be funds to cover travel expenses, in particular for young people. Please answer by January, 31<sup>st</sup> 2002. After your response we will prepare an official announcement and a web page.

With best regards,

Peter Senger

(for the local organizing committee)