

Discussion about a future
SPS program for
heavy-ion physics

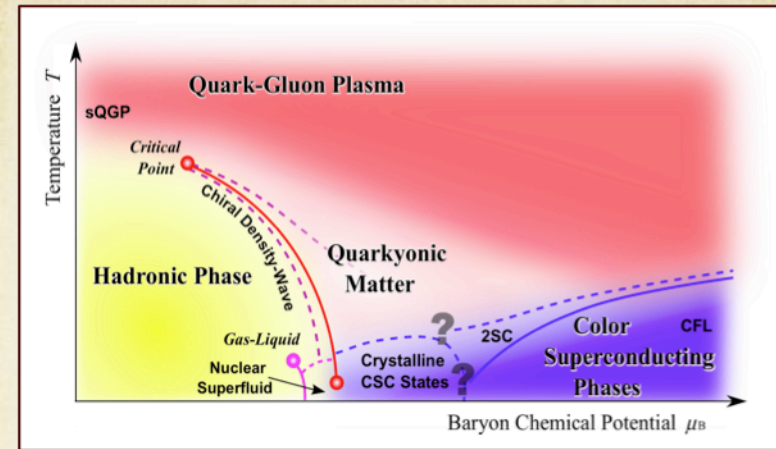
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CBM Rationale

- The Compressed Baryonic Matter program is the first to systematically explore the region of highest baryon densities using rare and penetrating probes!
- It is an integral part of the FAIR facility and physics program!
- Its physics potential is detailed in the CBM physics book!
- To achieve the physics goals an experiment phase of minimum ten years duration with run times of typically three month per year is needed!

Complementary programs



- Collider experiments (STAR, PHENIX, ALICE, ATLAS, CMS) work on precision measurements of QGP properties at $\mu_B \approx 0$
- CBM/HADES (NICA) will explore (net-)baryon-dense matter
 - Careful “subtraction” of “corona” effects
 - Open for discoveries (1st order phase transition etc.)
- BES, NA61, ... bridge between the two regions

The CBM strategy

- SIS100 day-one
 - Existing HADES spectrometer
 - dilepton excitation function (2-8 AGeV medium-heavy system)
 - Commissioning of CBM start version (STS, TOF)
 - Multi-strange baryons
- SIS100 full CBM (+MVD, +RICH, +TRD)
 - Di-electrons, strangeness, proton-induced charm
 - Start version of MUCH
- SIS300
 - Full physics program

Let's be realistic

- CBM poses technological challenges
 - Radiation hard tracking
 - Ultra-thin vertex detector
 - Free-streaming data acquisition (1 Tbyte/s)
 - Complex real-time event exploration
 - However, good progress in R&D
- Needs full commitment of the collaboration for another five years before installation can begin

CBM mission:

- CBM is designed to scan the QCD phase diagram at high net-baryon densities with high-precision data on multi-differential observables, hard and rare probes in heavy-ion collisions up to 45 A GeV.

Beam energy:

- FAIR-SIS300 energies cover the region of the highest baryon densities.
- RHIC beam energy scan produces precision data above top FAIR energies.

CBM realization:

- CBM collaboration: 450 people, 54 Institutions, 15 countries.
- FAIR provides mayor resources to realize CBM.
- CBM will be a high priority experiment at FAIR.
- CBM start version ready for SIS100 (2018).

SIS300 perspectives:

- SIS300 is integral part of FAIR as stretcher and booster
- SIS100/300-tunnel will be built large enough to host both synchrotrons
- R&D for SIS300 superconducting magnets progresses very sucessfully.