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A Muon Detection System for the CBM experiment at FAIR

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A Muon detection system is under development for the CBM experiment at the upcoming FAIR facility at GSI. By measuring muon pairs from the decay of low-mass vector mesons and charmonium, the Muon Chamber system (MUCH) will substantially contribute to the exploration of the QCD phase diagram at large baryon chemical potentials. The research program includes the search for de-confinement and chiral phase transitions, and for new phases of strongly interacting matter.

The MUCH subsystem is based on a novel concept of segmented absorbers with varying thickness and detector layers sandwiched between them. Detailed simulations have been performed to optimize the material, the thickness and the position of the absorbers, and the granularity of the detectors. The design goal is to simultaneously identify both high and low momentum muons over the full phase space.

A combination of large size GEM chambers and straw tubes will form the tracking detector system in MUCH. The detectors will be read out in a self-triggered mode to handle unprecedented high interaction rates of 10 MHz. Several prototype detectors have been built and tested successfully with X-rays and particle beams using a self-triggering readout electronics. Results of the feasibility studies and of the detector development will be presented.

On behalf of collaboration:

CBM

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