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RHIC online modeling and experience with feedbacks

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The RHIC online model is made of a lattice and energy ramp design used as inputs to two computation servers, RampManager and OptiCalc, each with their own dedicated purpose. In the past, the RHIC energy ramp was based entirely on stepstones to allow for orbit and tune control and beta* squeeze schemes evolving throughout the energy ramp. RampManager loads all required databases, services all incoming requests and calls the corresponding functions. OptiCalc is the optics calculation and matching module which provides also dedicated algorithms for each requested task. In this presentation we first review the various components of both of these servers. Next we show how the online model has evolved to interface with multiple feedback loops now used routinely at RHIC to accelerate, squeeze, and steer the beams into collisions and for periodic orbit control during normal physics stores. Dedicated accelerator physics experiments profit also from these enhanced capabilities; for example controlling these beam properties using feedback while dynamically squeezing the beta-star(s).

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