

The RHIC Injector Situation:

l ahrens 15Oct03

The Gold Plan:

This year's plan: the gold setup of two years ago plus a merge in longitudinal space during acceleration in the Booster - to allow a comfortable intensity margin over $1e9$ ions per bunch into RHIC. Before taxes this will double the per-bunch intensity. The time to fill RHIC will increase somewhat - we need 8 Booster cycles (instead of four) to fill the AGS, and each Booster cycle is longer - by about 130 ns - to accommodate the gymnastics.

Peter Thieberger's more uniformly thick stripping foils (in BtA) provide the needed (relative) reduction in the final bunch's longitudinal phase space size.

The smooth Silica foil tested last year provided the required momentum spread, but reduced the intensity by 15% (put less beam into the desired charge state). We have some new foils to test this year - to see if we can get back some of that intensity loss.

The Booster's two sets of accelerating cavities now allow for the gymnastics. The development of the merging of deuterons last year provided experience in the first part of the dance - the merge.

Mike Blaskiewicz recently gave Operations an introduction to the full rf performance in the Booster, and I will show his transparencies in a bit.

The Booster Problem:

We did discover a Booster problem a couple of weeks back, which led us to uncover another interesting situation. These I will briefly describe.

The problem was an unacceptably large current leakage at high voltage (during the “high-pot” of the system) in one of the basic Booster dipoles. The C5 dipole is also the location for injection of H⁻ into the Booster. The damage may be associated with radiation damage from proton injection, further stressed by the last bake out.

The magnet was removed from the ring. The coils were replaced. Everything is back and baked again. The high-pot is scheduled for today.

In order to remove the magnet, both (from Tandem and from the Linac) injection lines had to be removed. This allowed the opportunity to inspect the C3 electrostatic septum. The standoffs for the inflector cathode were found to display “tracking” and so required a disassembly and cleaning. This allowed inspection of the downstream end of the septum, which was found to have a “fold” in the center at the downstream end.

The fold in the septum would effectively increase the septum width significantly (from .025 inches to about .25 inches). Heavy ion injection stacks many tens of turns in horizontal (and vertical) betatron space. This is a big deal.

The septum “foil” has been replaced. The septum is back in the Booster and the Booster sections that were opened have been baked.

There could be some good news here. We will see, may get to gold next week.