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Accumulator/Booster alternative

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ACCUMULATOR/BOOSTER ALTERNATIVE

We suggest a possible alternative to the Accumulator/Booster. The large (rf: \$8M; ring magnet power supply: \$5M) preliminary cost estimates for A/B components prompted this type of radical speculation.

We suggest that a 4 GeV accumulator ring be built alongside the AGS in the present tunnel. The AGS would accelerate protons or H^- to 4 GeV and then inject them into the accumulator ring (stripping the H^-). This process would be repeated several times until the ring was filled. At this point, the protons in the accumulator ring would be synchronously transferred back to the AGS, where they would be accelerated to full energy.

The proposed scheme may achieve the goals of the A/B project at considerably reduced cost. For example, the accumulator ring will consist of unpulsed low-field magnets, which should make it simple and cheap. It can also be powered with an inexpensive DC supply. While some rf will be required for maintaining bunching in the accumulator ring, it need only be narrow band and probably not costly. Among the remaining uncertainties are whether the AGS vacuum is good enough to enable H^- to be accelerated to 4 GeV, and whether the acceleration from 200 MeV to 4 GeV can be performed quickly enough to make the time economics reasonable.

Since this idea was conceived, the authors have learned that Gordon Danby proposed a similar scheme many years ago. He suggested that the accumulator operate at $E \gtrsim 8$ GeV, with $\nu > 8$. By appropriately transferring the beam between the AGS and the booster, transition could be avoided. While Gordon cannot be held responsible for our mistakes, any merit to our suggestions derives in part from the fallout of his beneficial presence.