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Does ISABELLE Need Unequal Energy Rings?

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ABSTRACT

We list a few examples of the reason why we should have
separately functioning storage accelerators.

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This note is intended to summarize the reasons for the ISA to have two unequal energy rings. For unequal energy rings, there might be some complications and additional cost. However, if there are good reasons to be unequal, it is worth while to pursue the possibility. The following reasons are suggestive but not exhaustive:

- i) von Goeler argued¹⁾ in his note that unequal storage rings will give better resolution for missing mass experiments and effective mass experiments. He further argued for advantage in consistency checking and accessibility of certain kinematic regions.
- ii) If one wants to have the option of $\bar{p}$ -p interactions, it is essential to have two separately functioning storage accelerators. Both methods discussed up to date to create $\bar{p}$'s,²⁾ there is absolute necessity to have one ring store the particles while the other accelerates the anti-proton, if one wants to have any kind of luminosity.
- iii) For the luminosity measurement or calibration of monitors we need to know the beam-gas interaction rate monitored without disturbing the beam. One obvious way is to have one ring circulate the particles for beam gas interaction, then we can add another ring for the ratio of beam-beam to beam gas interaction. It is not absolutely necessary but very nice to have the separate function storage accelerator.
- iv) If we want to have the option of using ISA as a conventional accelerator, the duty factor could be doubled by having separate function storage accelerators.

There are many more reasons one can state. But the view of the fact that we should not exclude any of the needed and good options, it is clear that we need to have the two separate function storage rings if the cost requirement is not too excessive.

References

- 1) E. von Goeler, CRISP 71-31.
- 2) From the discussion in ISABELLE Summer Study on Other Options.