Polarimetry parameters and requirements

C. Montag

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Protons

energy [GeV]	42	100	275
bunch spacing [nsec]	9	9	36 (9)
bunch length [cm]	5-7	7-11	7.5-13
bunch intensity [10^{10}]	1.1-6.3	4.7-11.4	6-20
polarization lifetime [h]	> 30	> 30	> 30

• Parameters differ depending on electron beam energy, and on availability of strong hadron cooling

• Polarization lifetime expected to improve due to additional snakes necessary for deuterons and He3

• Beam sizes without cooling will be similar (within 30 percent) to present RHIC. Without cooling, vertical size is factor 4-5 smaller

Electrons

energy [GeV]	5	10	18
bunch spacing [nsec]	9	9	36
bunch length [cm]	2.3	1.9	1.7
bunch intensity [10^{10}]	15.1-30	15.1-30	6.3
polarization lifetime [h]	5	3	0.4

• Parameters differ depending on availability of strong hadron cooling

Polarimetry requirements and general comments

- RCS commissioning requires fast (few turns) polarimetry at arbitrary energies, from 400 MeV to 18 GeV

- Alternatively, RCS beam can be extracted into storage ring to measure polarization there over few minutes

- Fastest depolarization time in storage ring is 20 to 30 minutes (at 18 GeV)

- Longitudinal proton polarization at IP needs to be verified. No such need for electrons as imperfect rotation would lead to fast depolarization

- Luminosity sharing scheme with two detectors requires bunch-by-bunch polarimetry

- Proton polarization preservation on the ramp depends critically on tunes and orbits. Additional snakes will open up a wider tune space