

Accelerator Issues Raised in Hall A Parity Collaboration Meeting, April 17-18

B-Team Meeting

April 29, 2009

Upcoming Parity Experiments

Experiment	Hall	Start	Energy (GeV)	Current (μA)	Target	A_{PV}	Charge Asym (ppm)	Position Diff (nm)
HAPPEX-III	A	Aug 09	3.484	85	^1H (25 cm)	16.9 ± 0.4 (ppm)	✓	✓
PV-DIS	A	Oct 09	6.068	85	^2H (25 cm)	63 ± 3 (ppm)	✓	✓
PREx	A	March 10	1.056	50	^{208}Pb (0.5 mm)	500 ± 15 (ppb)	0.1	2
QWeak	C	May 10	1.162	180	^1H (35 cm)	234 ± 5 (ppb)	0.1	2

Accelerator Issues

1. HAPPEX III:

- ✓ Transverse Beam Polarization < 1%:
 - Monitor Horizontal Polarization (Precession Stability of 1 degree):
 - ✓ Spin-dance: measure polarization in Injector and Hall A
 - ✓ Monitor beam energy and linac asymmetry
 - ✓ Measure up-down single-spin beam asymmetry in Hall A → tweak Wien angle once a week
 - Monitor Vertical Polarization:
 - ✓ Use 5 MeV Mott

- ✓ Measure Longitudinal Polarization to 1%: use Compton and Moller Polarimeters

- ✓ 0.1 nA for calibration

- ✓ Revive or upgrade Beam x, y, E Modulation.
May need Current Modulation: 10% at 10 Hz, can we do it?

- ✓ 30 Hz Helicity Reversal

2. PVDIS:

- ✓ 85 μA on 25 cm liquid deuterium at 6.068 GeV: low beam-trip rate
- ✓ Transverse Beam Polarization ???
- ✓ Measure Longitudinal Polarization to 1%
- ✓ 30 Hz Helicity Reversal

3. PREx:

- ✓ Transverse Beam Polarization < 1%
- ✓ Measure Longitudinal Polarization to 1%
- ✓ Double Wien
- ✓ 0.1 nA for calibration
- ✓ 240 Hz Helicity Reversal (Line-Locked)

4. QWeak:

- ✓ 180 μA on 35 cm liquid hydrogen: low beam-trip rate
- ✓ Transverse Beam Polarization < 5 % (Precession Stability of 3 degrees)
- ✓ Measure Longitudinal Polarization to 1%
- ✓ 0.1 nA for calibration
- ✓ 1 kHz Helicity Reversal