Polarized Target

for

Experiment E01-006

Spin Structure in the

Resonance Region

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Changes from G_{en}

- Beam Windows on Cryostat
- NMR - Need to use all 4 QMeters (Top/Bottom, Proton/Deuteron), instead of just 2
- Offline Analysis - Some simplifications for proton NMR signals
- Insert - Need at least 2 inserts: one for NH_3 and one for ND_3
- Material - Need sufficient NH_3 and ND_3 for run

Proton Material

- Simple NMR lineshape and large magnetic moment yield good signal-to-noise

- Short polarizing times

- Anneal cycles of 10 to 15 $\times 10^{15} e^{-}$ (in 75nA beam)

- Good performance for 50 to 100 $\times 10^{15} e^{-}$ (in 75nA beam)

- Have several batches of somewhat aged material

Deuteron Material

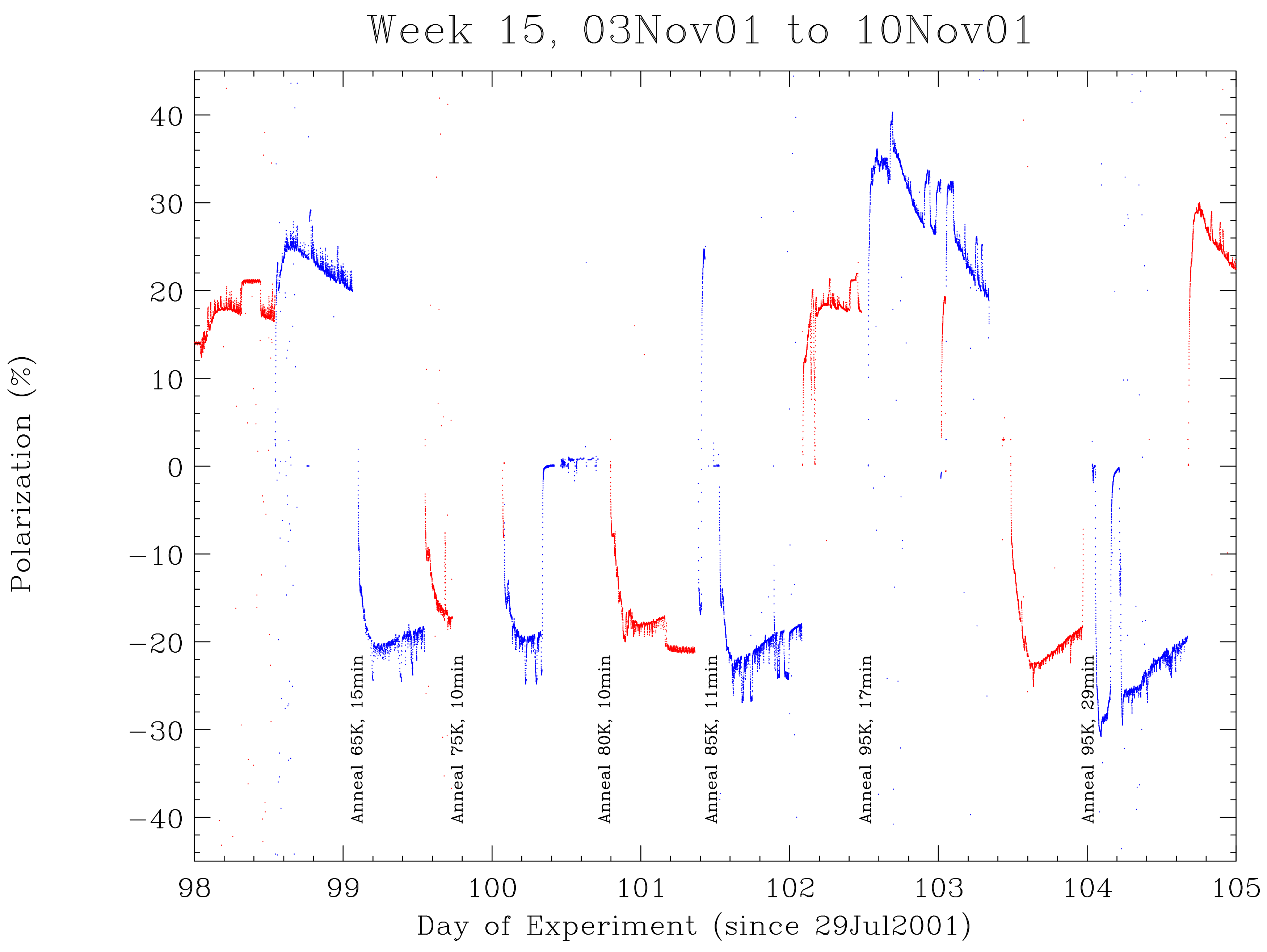
- Quadrupole-split NMR lineshape and smaller magnetic moment make accurate calibration more difficult, but also allow an alternate method of analysis

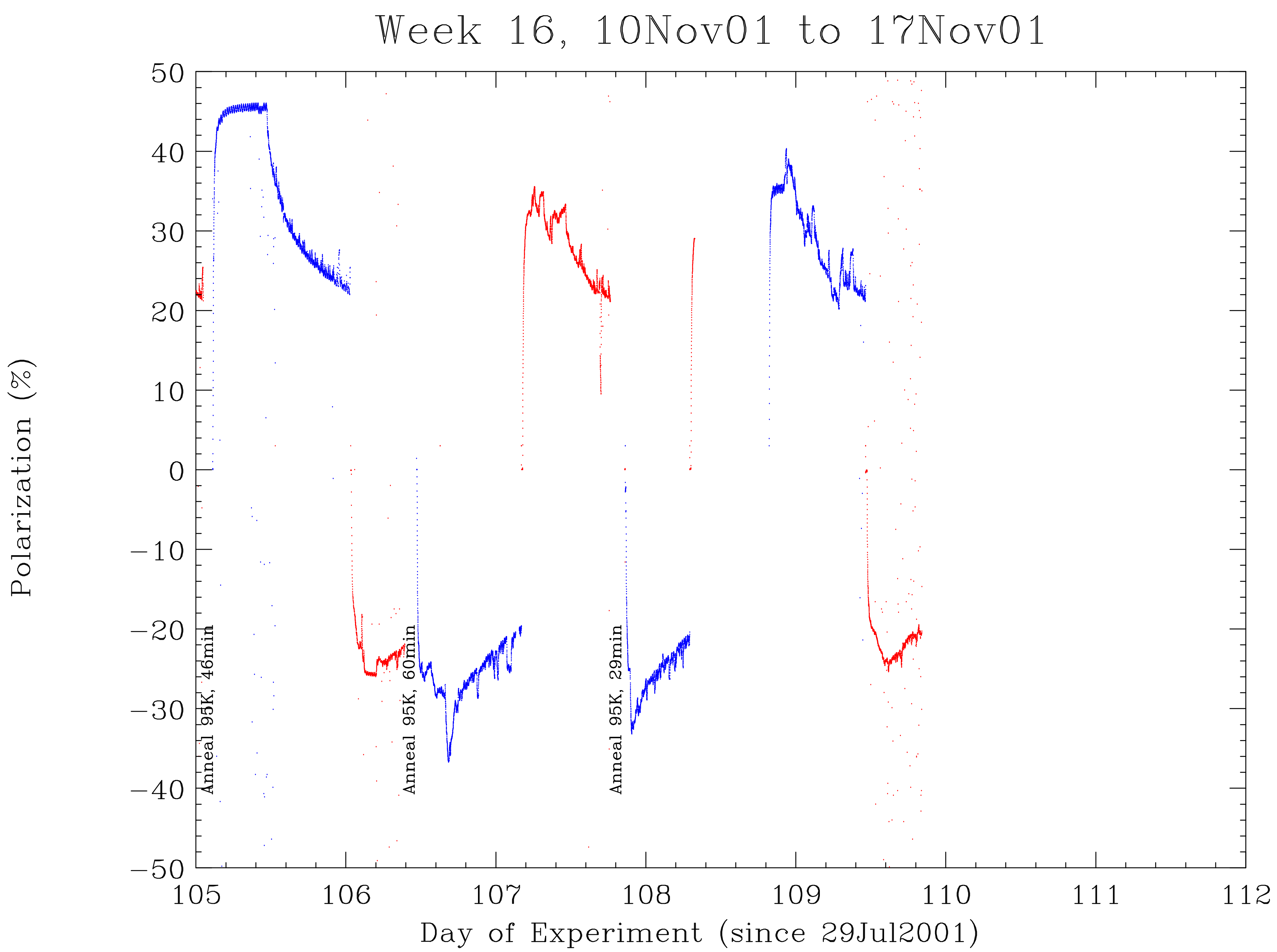
- Somewhat longer polarizing times

- Anneal cycles of 10 to 15 $\times 10^{15} e^{-}$ (in 100nA beam)

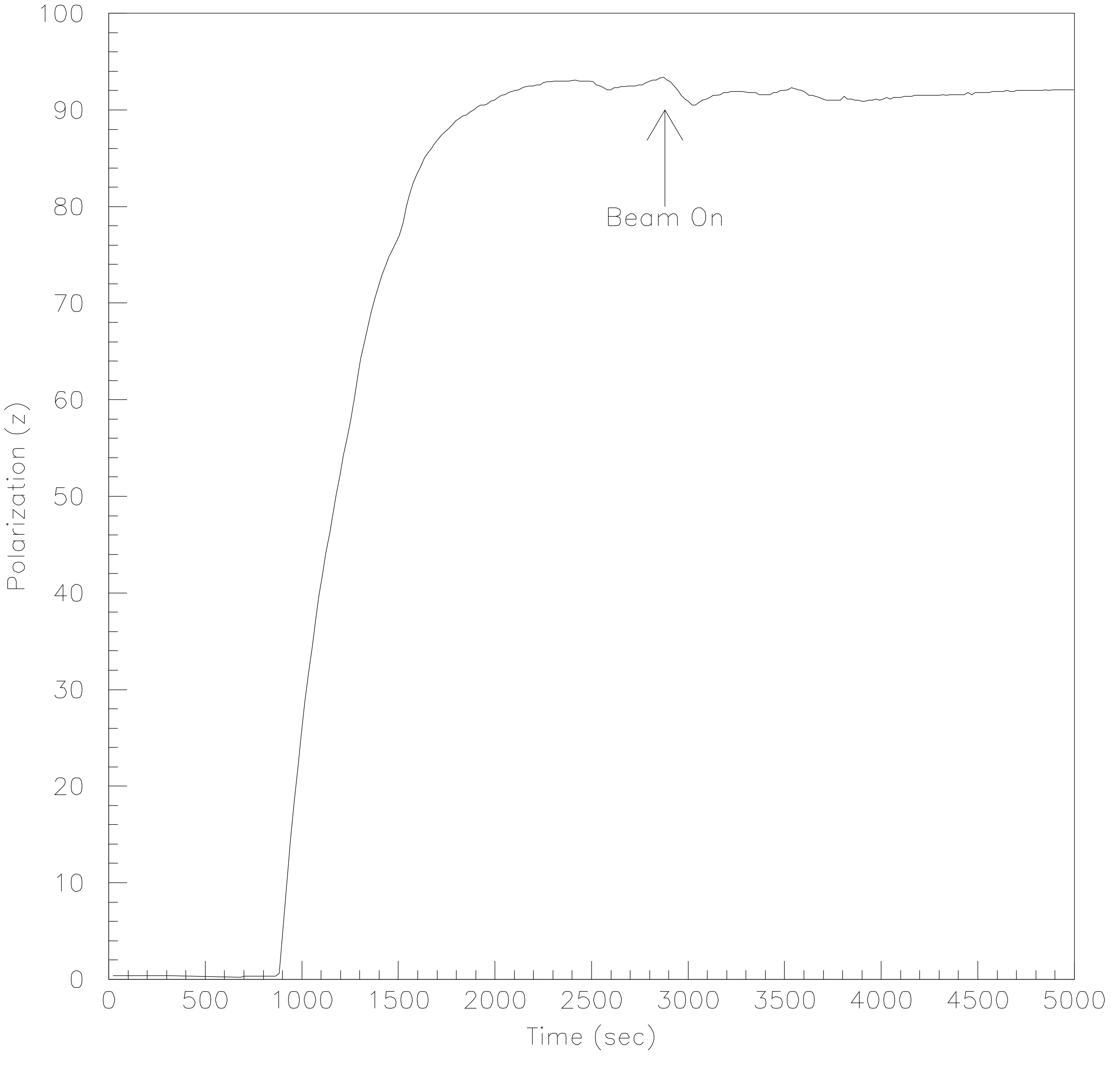
- Unknown maximum material lifetime

- Have Gen material, other loads, copious raw (unirradiated) material

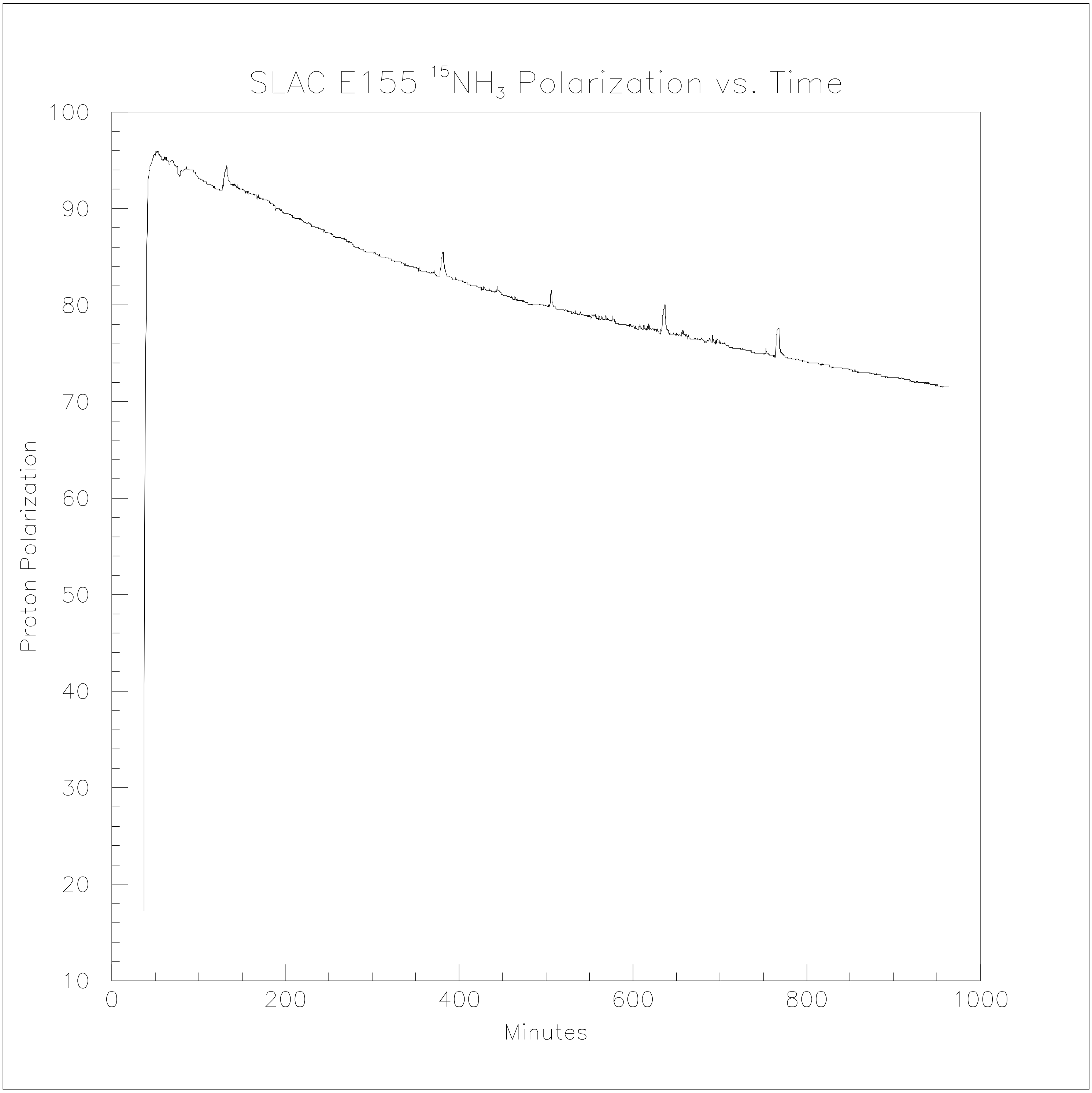

Week 15, 03Nov01 to 10Nov01
Polarization (%)
40
30
20
10
0
−10
−20
−30
−40
98
99
100
101
102
103
104
105
Day of Experiment (since 29Jul2001)
Anneal 65K, 15min
Anneal 75K, 10min
Anneal 80K, 10min
Anneal 85K, 11min
Anneal 95K, 17min
Anneal 95K, 29min

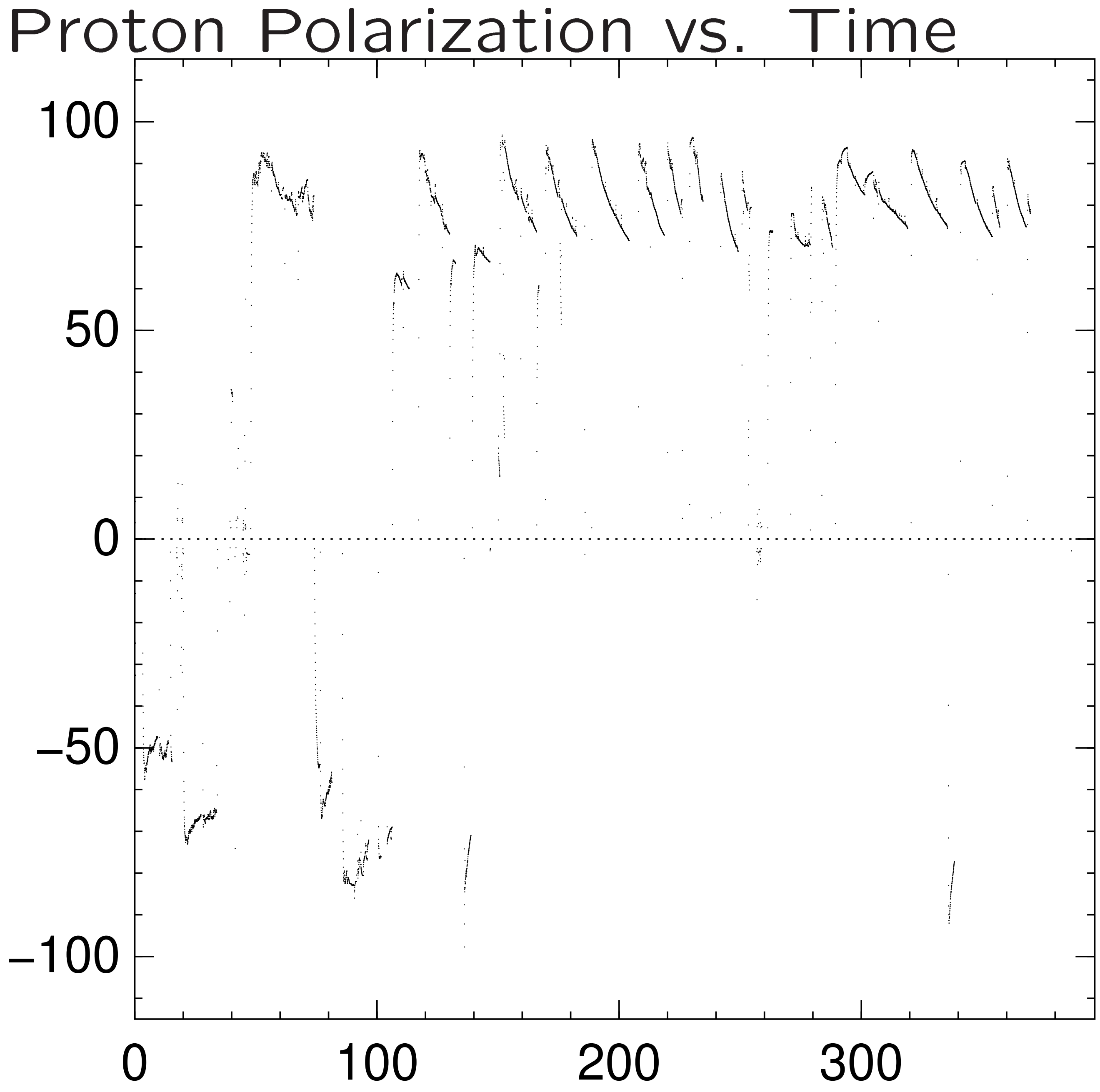

Week 16, 10Nov01 to 17Nov01
Polarization (%)
Day of Experiment (since 29Jul2001)
Anneal 95K, 46min
Anneal 95K, 60min
Anneal 95K, 29min
50
40
30
20
10
0
−10
−20
−30
−40
−50
105
106
107
108
109
110
111
112

Sample NH3 Buildup



Sample NH3 Anneal cycle




Proton Polarization vs. Time
100
50
0
−50
−100
0
100
200
300

Sample Proton NMR Signal