
Polarization in Study 2a Front End

R.C. Fernow & J.C. Gallardo
BNL

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Muon polarization

- μ polarization is a complication for NF experiments
- affects ν cross sections so we need to know the value
- front end polarization effects that must be simulated
 - polarization from π decay in lab
 - acceptance cuts
 - differential spin precession in E and B fields
 - depolarization in windows and absorbers
- use new 10 GeV on mercury beam file from ISS studies (HK)
- use Study 2a front end

Polarization in PJK Study

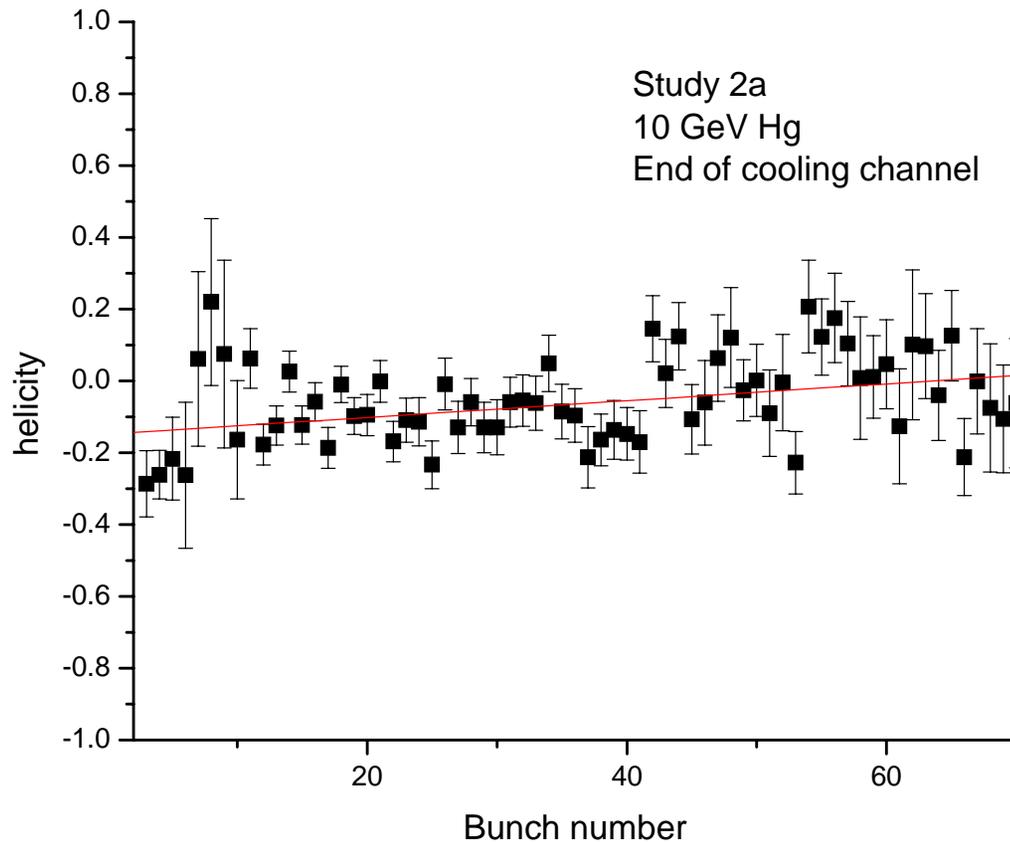
- last polarization study was in 2000
- 24 GeV mercury interactions
- used RF close to target decrease $\pi \Delta p$ before decay
- $\langle \text{helicity} \rangle$ of all captured μ was $-19 \pm 1\%$
- at end of cooling
 - helicity was correlated with location in bunch train
 - peak helicity values $\sim \pm 55\%$

Study 2a average polarizaton

4 m from target	-0.135 ± 0.011
end of taper (12 m)	-0.144 ± 0.008
end of decay region (111 m)	-0.142 ± 0.006
end of cooling (295 m)	-0.131 ± 0.009

- muons from decay only
- polarization of captured μ less than PJK (?)
- $\sim 8\%$ loss from depolarization

Helicity in bunch train



- peak magnitude and correlation much less than PJK