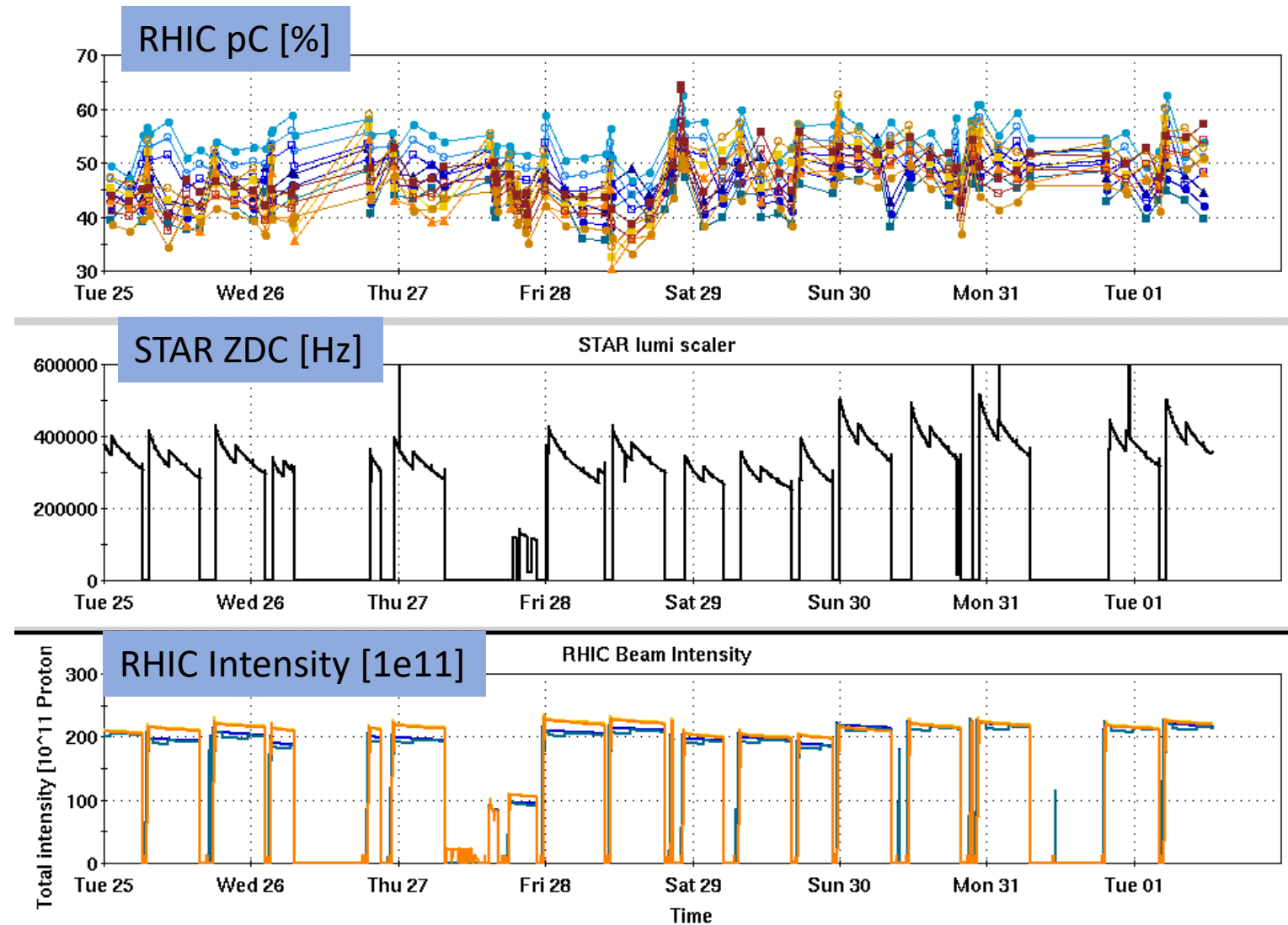


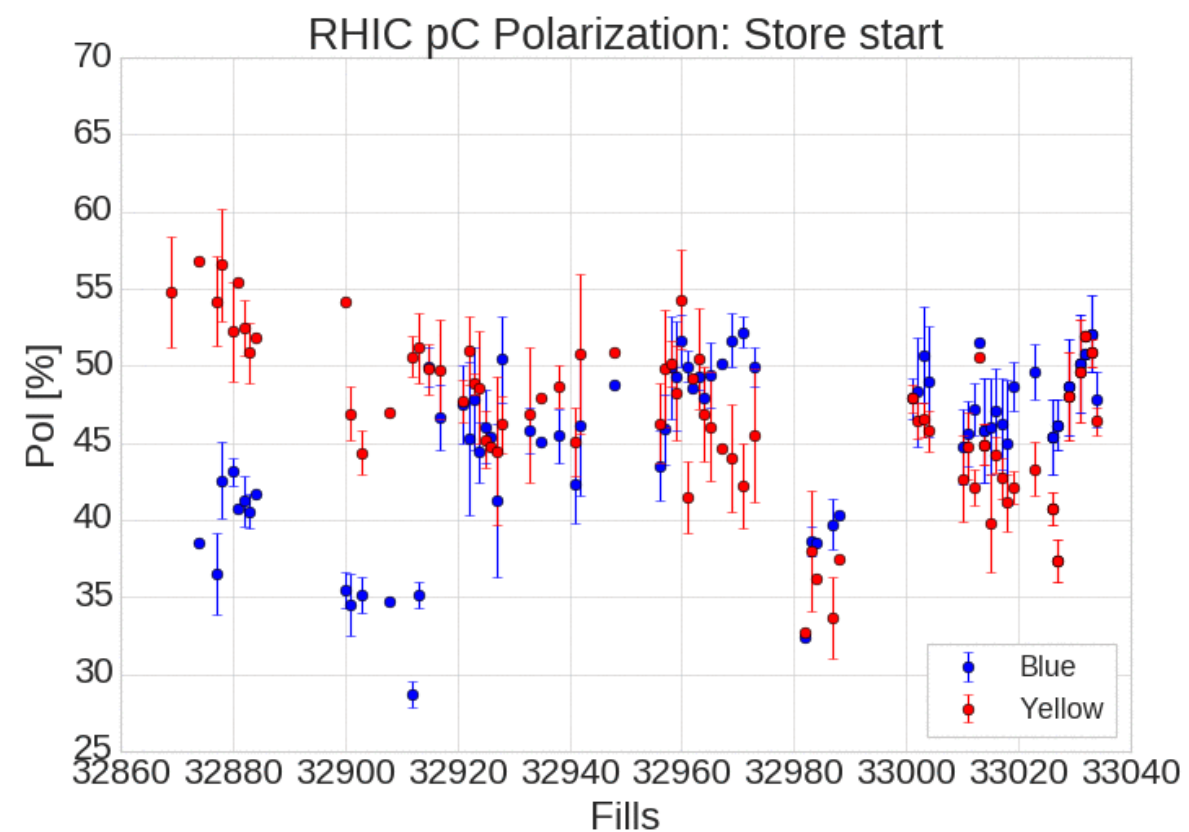
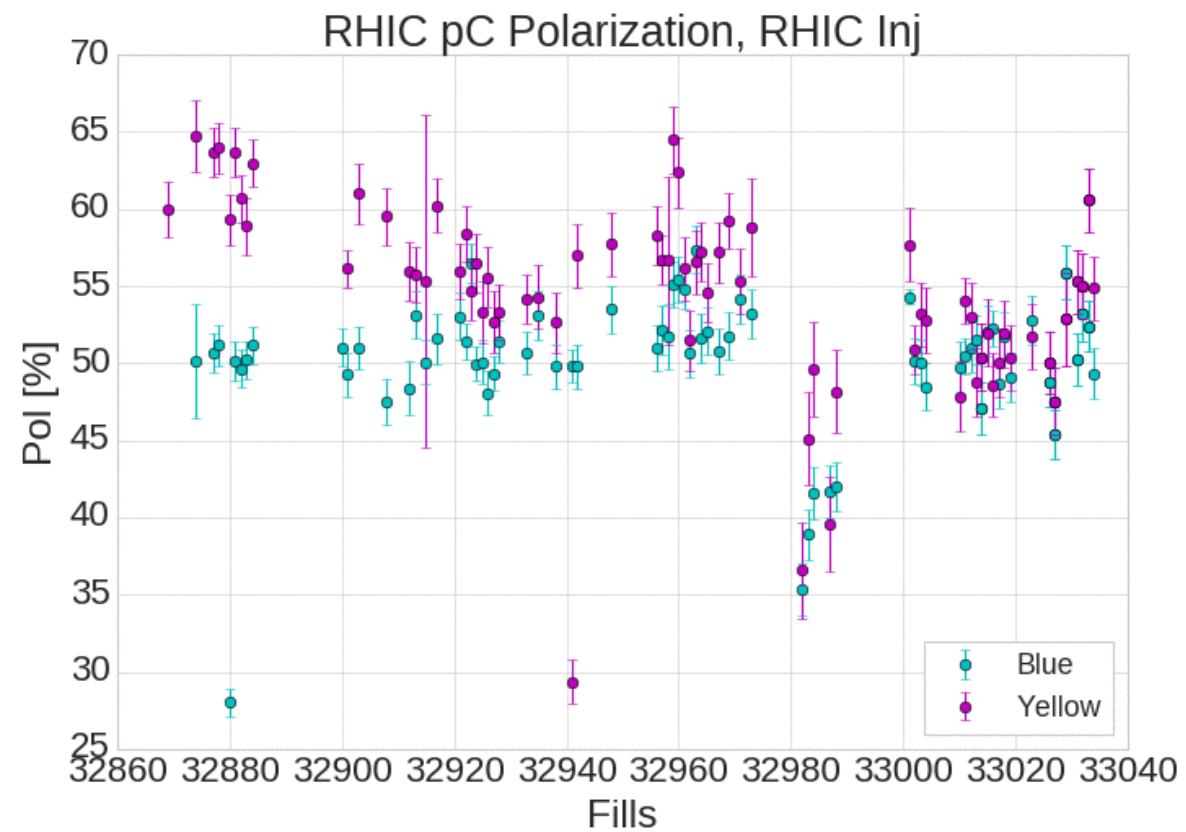
# RHIC Run 22 Run Status

2/1/2022, V. Schoefer

- Stores with immediate beta squeeze from 1->1.2 m now meet per store STAR lumi goals (last 5 fills)
  - Improvement largely due to injection efficiency improvement
  - Inj efficiency still just about 90% with many adjustments and large injection bumps (should be >95% with protons without any closed orbit adjustment)
  - RHIC injection kicker angle appears to be low, yellow appears to be weakening with time
- Thurs Jan 27: Successful measurement of spin direction with yellow rotators on, analysis to infer orientation with rotators off ongoing, plans for corrective measures.



## RHIC pC polarizations

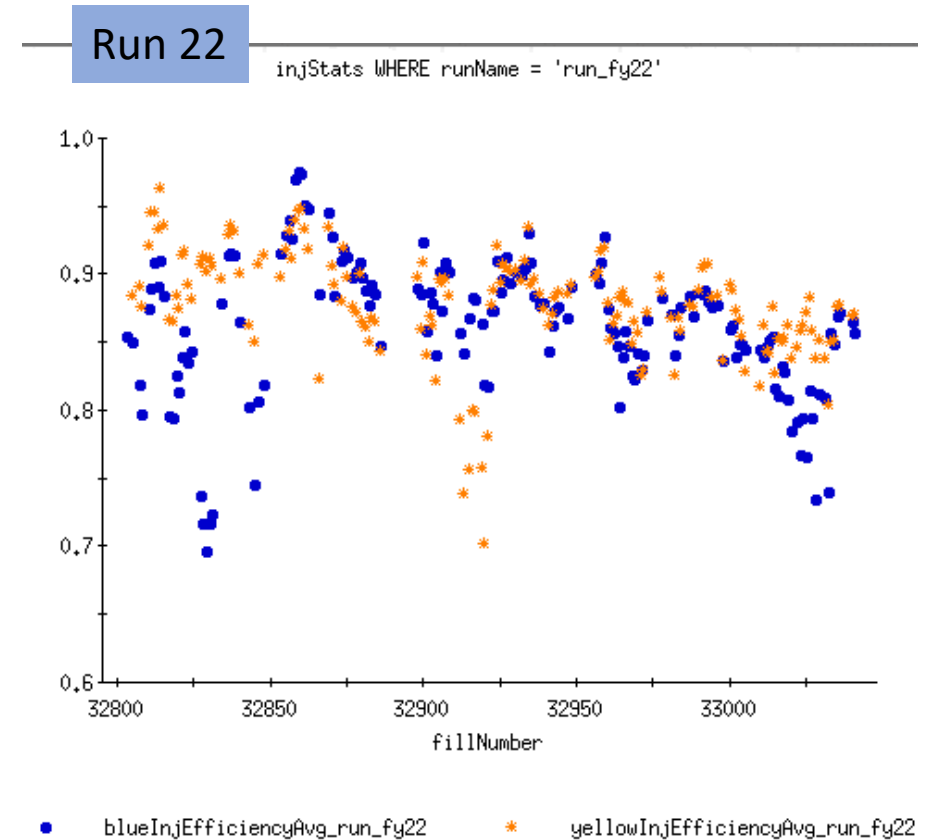
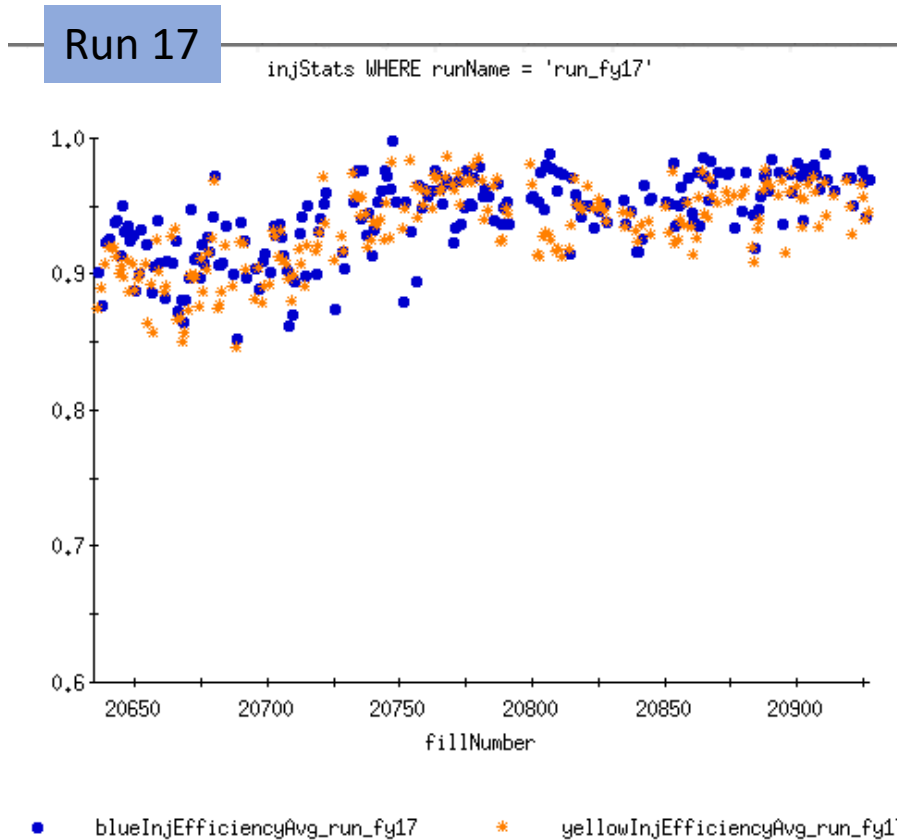


## RHIC Injection Efficiencies

RHIC Injection difficult essentially from start of run.

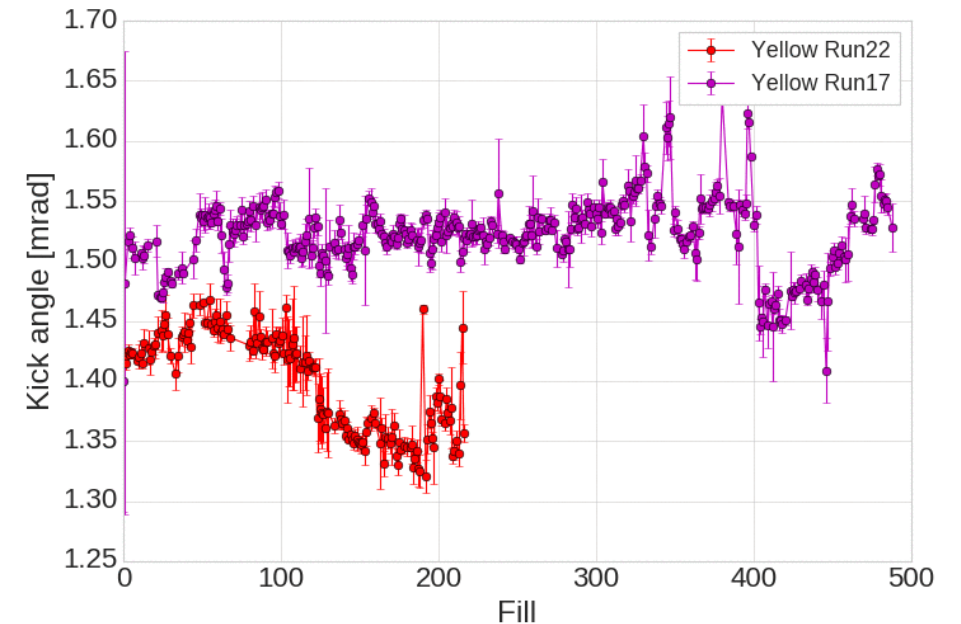
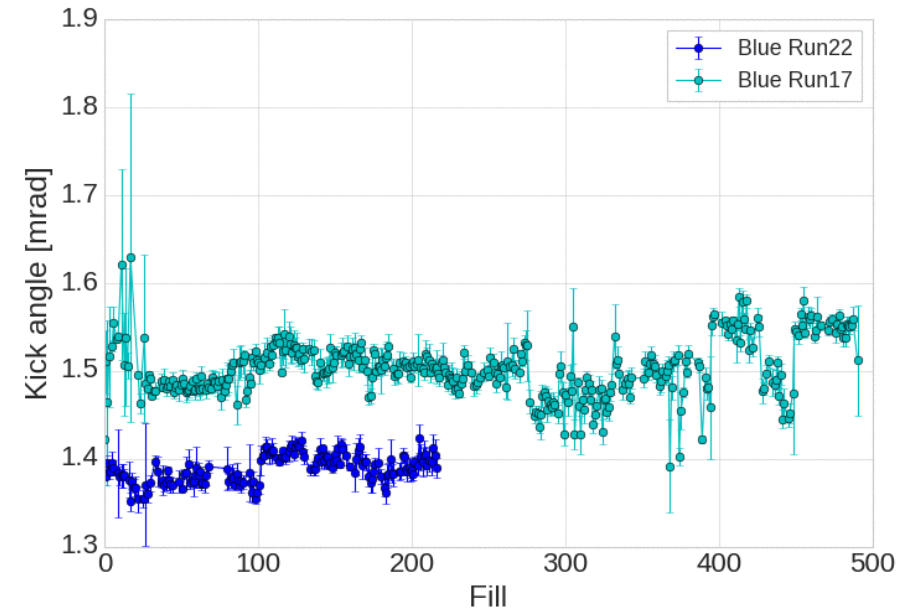
Declining consistently with periodic improvements from rounds of tuning

Most improvements come from changes that reduce necessary injection angle



## Injection kicker angle

- Early run RHIC transverse emittance a factor of two over expectation
- Investigated and found both injection kickers lower than expected
  - Compensation
    - Recalibration of charging supply chain (around fill #100 in plots)
    - Installation of injection bumps in closed orbit (both)
- Yellow angle has weakened since start of run.
- Blue injection efficiency has never been at Run 17 levels (and not improving quickly anymore)
- Requires taking more intensity out of AGS, impacts intensity, emittance and polarization in RHIC.
- More investigation into causes is ongoing
- Possible remediation:
  - Further closed orbit manipulations (limited by aperture)
  - One injection kicker = four modules. Two spare magnet modules available. Replacement possible (this week?)
  - Adjustment of IR6 injection optics to optimize deflection of incoming beam by Q8,Q9



# Plans

- Analysis of spin orientation at IP6 and calculation of corrections (e.g. small rotator current in physics stores)
- Remediating measures for the injection kickers (including possible module replacement)
- Imperfection corrections (scheduled for Friday, Feb 4<sup>th</sup>), aimed at improving RHIC polarization transmission