Acceleration beyond 100 GeV

- Goal
  - To evaluate the spin dynamics beyond 100 GeV
    - What's the impact of 1mm rms orbit distortion(achieved) on the polarization transmission efficiency?
    - How much can we correct the orbit with the existing RHIC orbit correction system at higher energy?
  - To provide a guidance/justification for the full ring re-alignment of RHIC during summer of 2005
- Expection
  - Little or no polarization is expected at energy of 205 GeV with 1mm orbit distortion
  - Polarization ramp measurement will be the key technique in exploring the depolarization mechanisms and locations.

Machine Configuration for pp to 205 GeV

- Energy
  - Injection: 46.5
  - Store: 391.5
- Working point
  - Ramp I: 28.72, 29.73 (injection to 100 GeV)
  - Ramp II: 28.68, 29.69 (100 GeV to 205 GeV)
  - Store: 28.68, 29.69
- Lattice: IP 6 8 10 12 2 4
  - Injection: 10 10 10 10 10 10
  - Store: 2.0 2.0 10 5 3 10
- Collision Pt (option): 6 8 10
- RF:
  - No re-bucketing at store

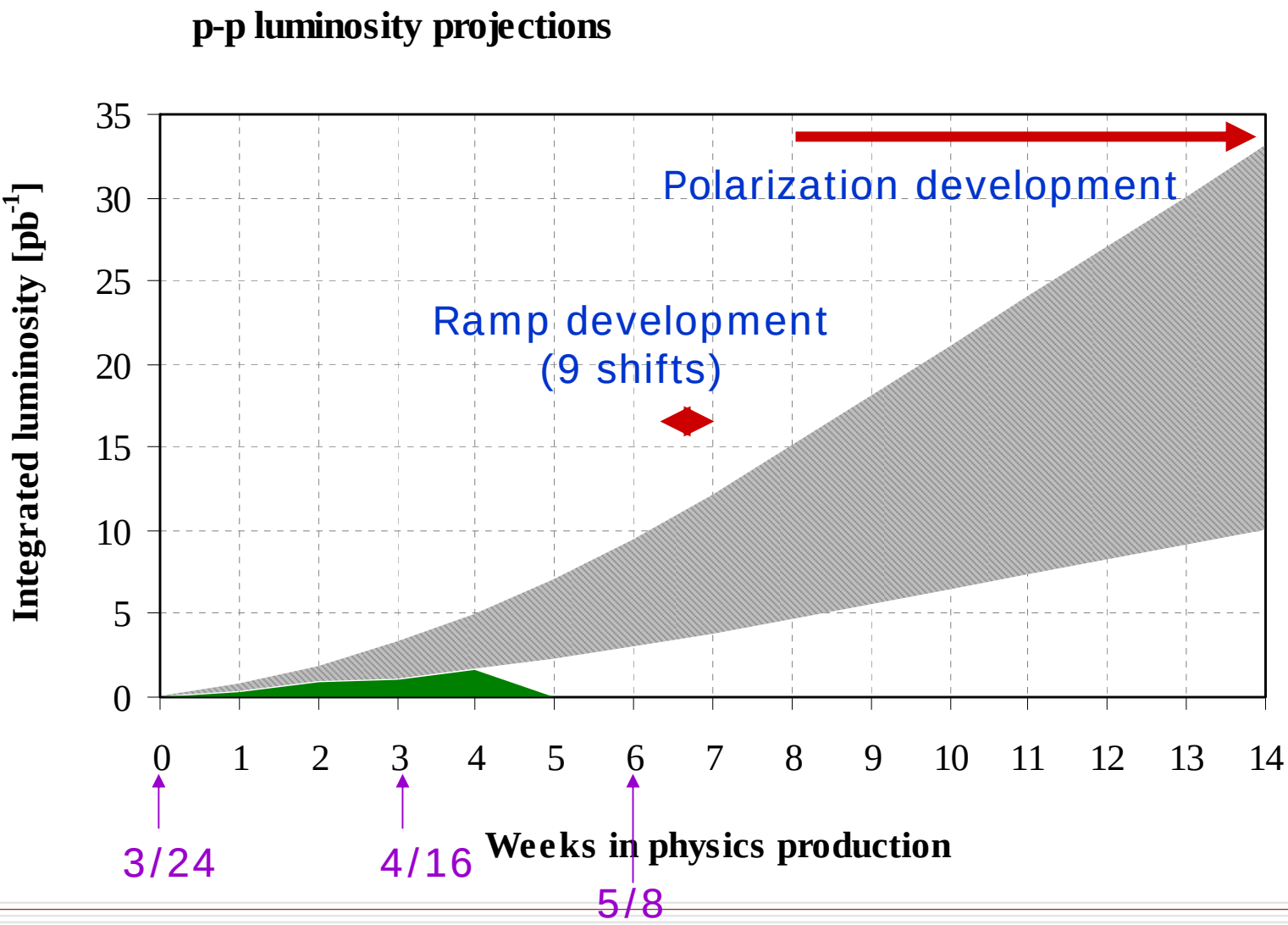
Plan for 205 GeV development

- Ramp development
  - Goal:
    - Adjust tunes, chromaticity, orbits and etc to maximize the beam transmission efficiency
    - Keep the tunes stay in the snake-resonance free region and minimize the orbit distortion as much as possible
    - Polarization ramp measurement once a working ramp is available. Expect to use 2 ramps
  - Estimate time: 9 consecutive shifts

Plan for 205 GeV development

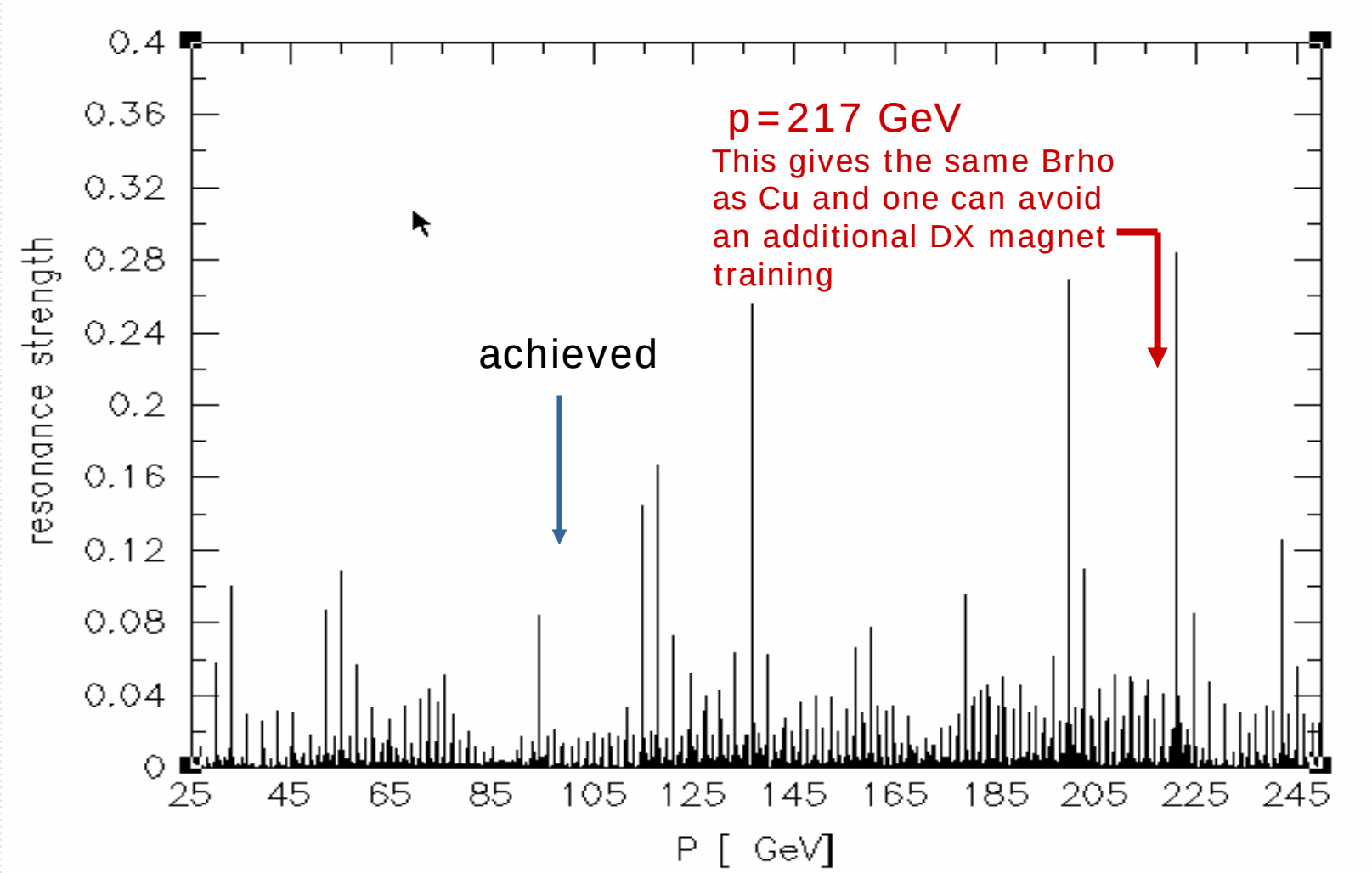
- Polarization development
  - Goal:
    - Understand the spin dynamics beyond 100 GeV. This will allow us to benchmark our simulation model and provide guideline.
  - Task list
    - Measure the polarization as a function of orbit distortion around 135 GeV where a strong intrinsic resonance is
      - Intrinsic resonance strength: 0.3 for a 10 pi mm-mrad particle
      - imperfect: 0.12 for 1mm rms orbit distortion
      - 4 datapts: 0.5mm, 1mm, 2mm, 4mm
      - Keep Qy at 0.68
      - 12 ramps in total: 2 shifts
    - Measure the polarization as a function of tune with an fixed orbit distortion
      - The orbit distortion will depend on the previous study
      - 4 datapts: 0.74, 0.70, 0.67
      - 10 ramps in total: 2 shifts

Timeline for 205 GeV development



Challenge of going beyond 100 GeV

Intrinsic spin resonance
Qx=28.73, Qy=29.72, emit= 10



Machine Configuration for pp to 170 GeV

- Energy
  - Injection: 46.5
  - Store: 324.5
- Working point
  - Ramp: 28.72, 29.73
  - Store: 28.68, 29.69
- Lattice: IP 6 8 10 12 2 4
  - Injection: 10 10 10 10 10 10
  - Store: 2 2 10 5 3 10
- Collision pt: 6 8
- RF:
  - No rebucketing at store