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

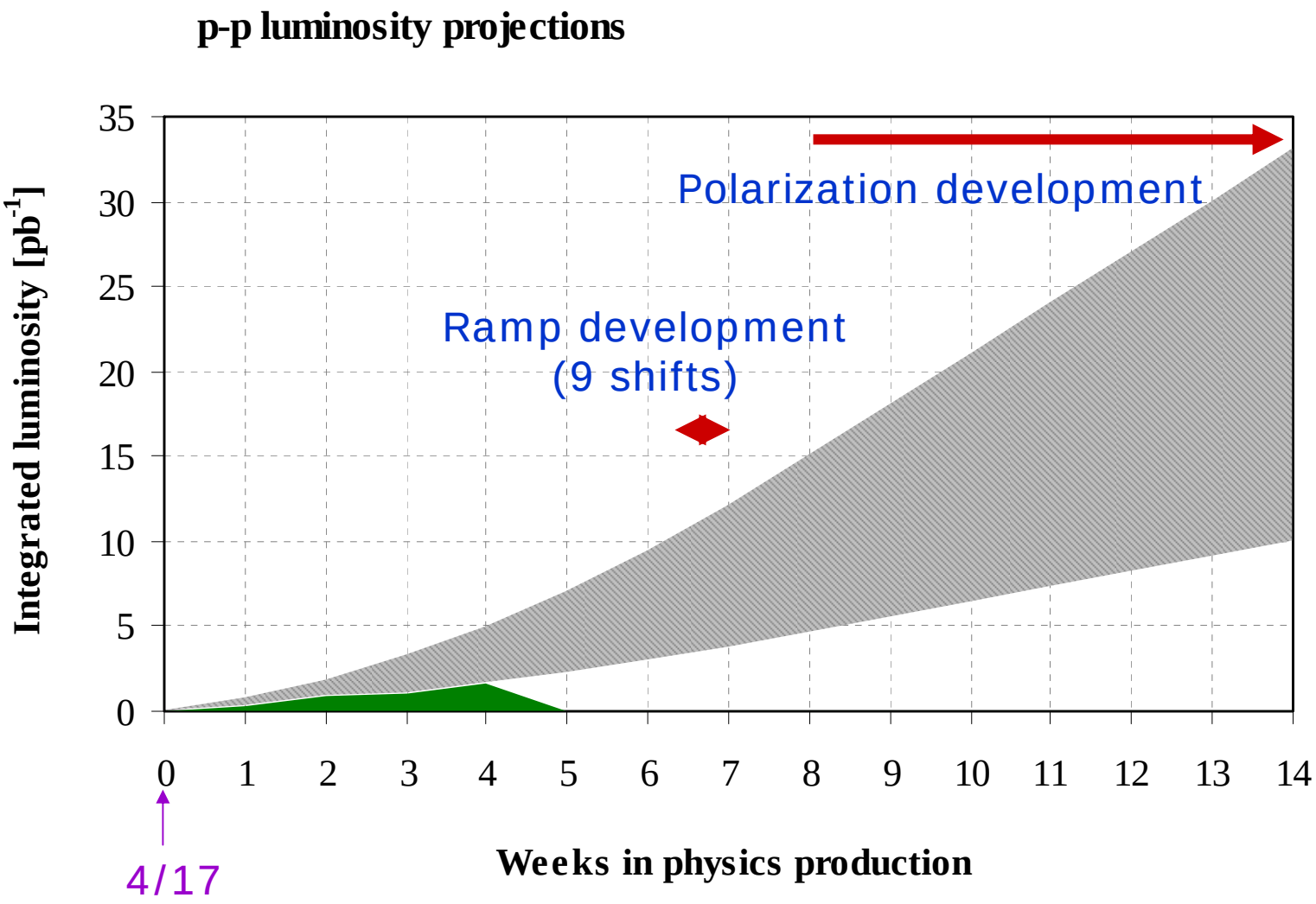
Schedule: May 31 0800 – June 3 0800

- May 31 0800 – May 31 2400
  - 8 bunch ramp development
    - Adjust orbits/tunes/chromaticities along the ramp to maximize transmission efficiency
    - Global decoupling along the ramp
    - Tunes: Qx=0.69, Qy=0.68
    - Orbits: rms ~ 0.5mm or better
    - Separation bump through the ramp
- May 31 2400 – June 1 1600
  - Global decoupling along the ramp
  - Local IR non-linear correction
- June 1 1600 – June 2 0800
  - 56 bunch ramp development
    - Fine adjustment of tunes/chromaticities
    - Polarization measurement along the ramp
    - Collision setup
      - Cog beam into collision, fine adjust orbits/optics to minimize the beam decay
- June 2 0800 – June 2 1600
  - Store setup: IP6, IP8, IP10
    - Steering setup
    - Collimation setup
- June 2 1600 – June 3 0800: store at 205 GeV

RHIC Shift leader Schedule

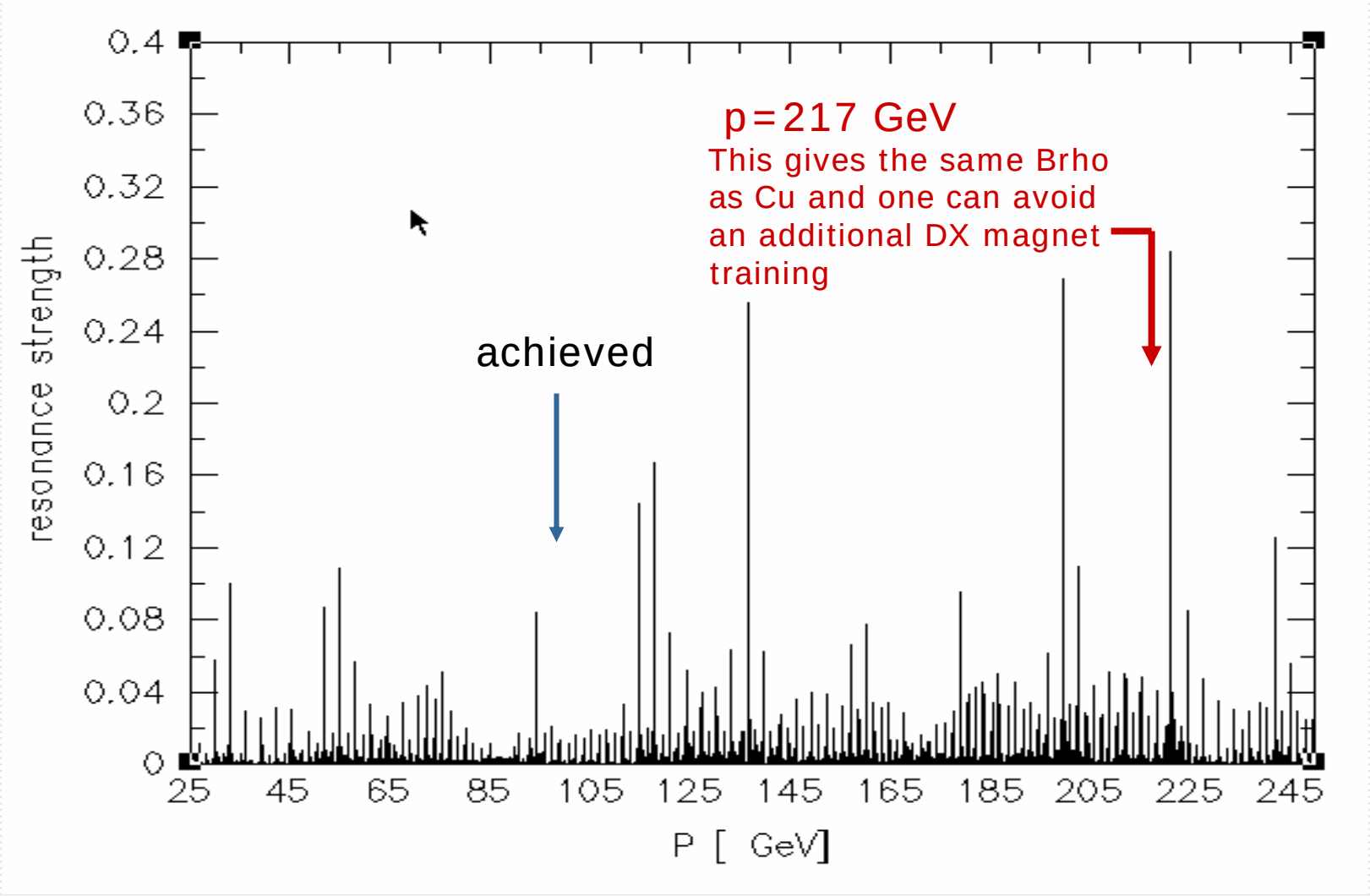
- May 31 0800 – May 31 1600: Todd
- May 31 1600 – May 31 2400: Vadim
- May 31 2400 – June 1 0800: Yun
- June 1 0800 – June 1 1600: Fulvia
- June 1 1600 – June 1 2400: Jorg
- June 1 2400 – June 2 0800: Mei
- June 2 0800 – June 2 1600: Angelika

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