diffraction @ run13

pp2pp and pp main run

- pp2pp dedicated run
  - measurements: elastic/total cross-section and central exclusive diffraction/double pomeron exchange process
  - beam: 4 days with β^*=9m and transverse pol.
  - trigger: tagging protons in both or one side of RP
- pp main run
  - measurements: spin-dependent, independent particle production/ meson spectroscopy in central diffraction
  - trigger: rapidity-gap trigger ("UPC" trigger-like): BBC veto + ToF (+BTOW, high-pt)
  - Request ~10 Hz rate (pre-scale of O(100) at $\mathcal{L}$=1.5*10^{32} $cm^{-2}s^{-1}$)

Roman Pot Triggers (dedicated run)
Run9 and new in Run13

1. Elastic (collinear ~~&& not.(UpDown.or.InnerOuter)~~)
2. Inelastic (EastOR ~~&& not.(UpDown.or.InnerOuter)~~) && (West...)
3. SDD-W (EastOR && BBC-W)
4. SDD-E (WestOR && BBC-E)
5. CP1 (Inelastic && not.Elastic)
6. CP2 (Elastic && ToF)
7. RapidityGap-W (EastOR && not.BBC-W)
8. RapidityGap-E (WestOR && not.BBC-E)

Rapidity gap trigger
with pp main running at $\sqrt{s}$=510GeV

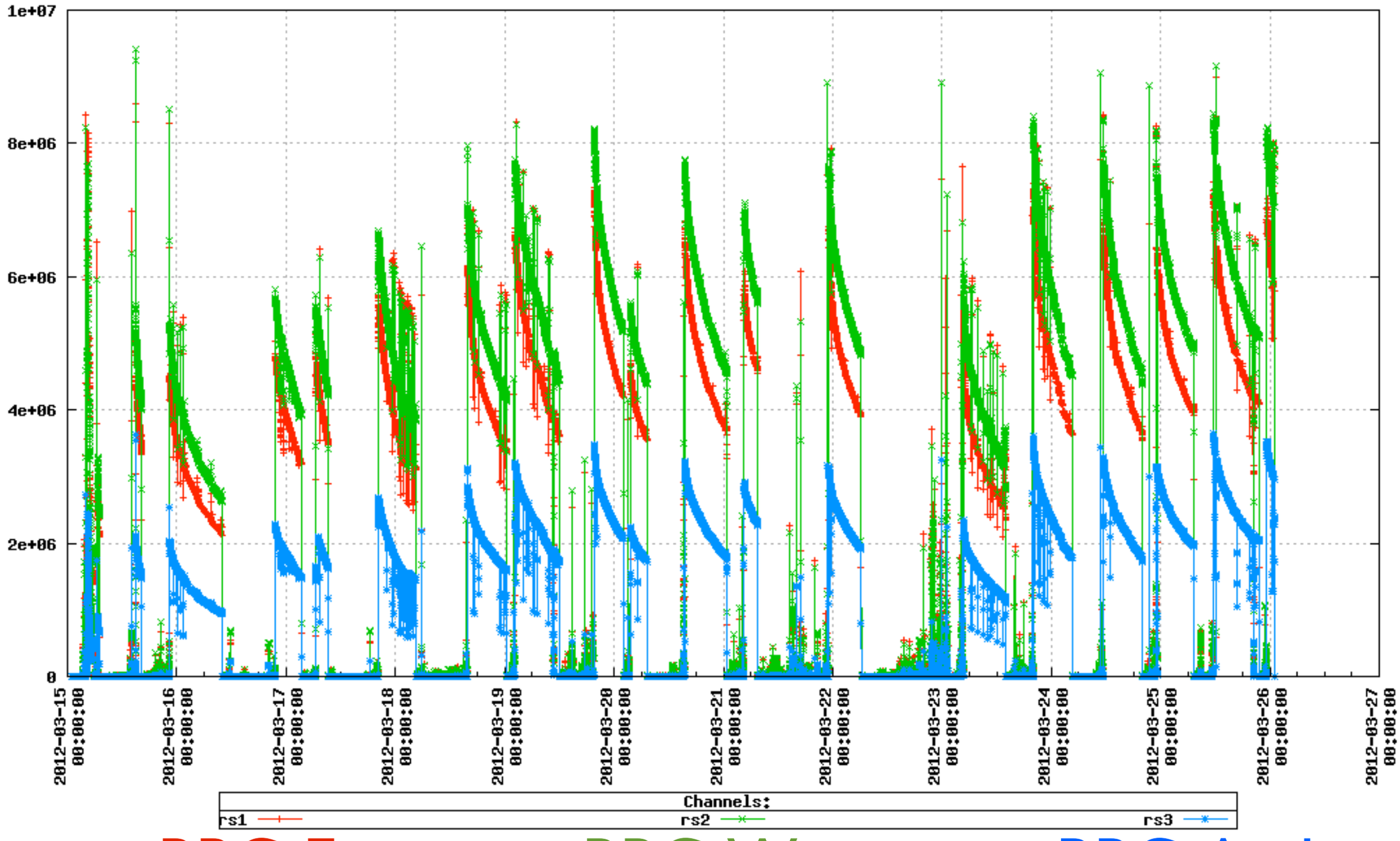
- Pomeron exchanges dominate when Rapidity gap ≳ 3
- central diffraction rapidity gap trigger (RGT) used in colliders: CDF, ALICE
- Uniqueness at STAR/RHIC:
  - spin-dependence, wide kinematic coverage
    low-t: with Roman Pot high-t: with rapidity gap (+phase2)
- expected to have ~10K Hz "empty"/double rapidity gap events assuming at $\mathcal{L}$=1.5*10^{32}cm^{-2}s^{-1} and ~1 mbarn DPE cross-section
- Request: ~10 Hz bandwidth with RGT (BBC Veto + 0<ToF 1≤mult≤6)
- If RGT works and bandwidth allows: +BTOW,+High-pt

Rate estimates with RGP

- Cross-sections for the mesons of interest ($f_2(1270)$,$f_0(1500)$,$f_J(1710)$...) are O(μbarn), which gives O(1K) Hz cross-section rate at $\mathcal{L}=1\times10^{32}cm^{-2}s^{-1}$ in the mass region.

- Assuming:
  - rapidity gap trigger efficiency~0.1
  - acceptance of decay particles~0.3
  - tracking/pid efficiency ~0.5
  - branching ratio ~ O(10%)
  - trigger pre-scale factor x100 to keep the bandwidth ~O(10)Hz.
- Then a perfect full day (24 hours) will gives ~1300 candidates
- 15 weeks of running with 50% of machine efficiency will result ~70K events:
  ⇒ possible mass dependent differential / spin-parity analysis

BBC singles/and rates



BBC-E BBC-W BBC-And