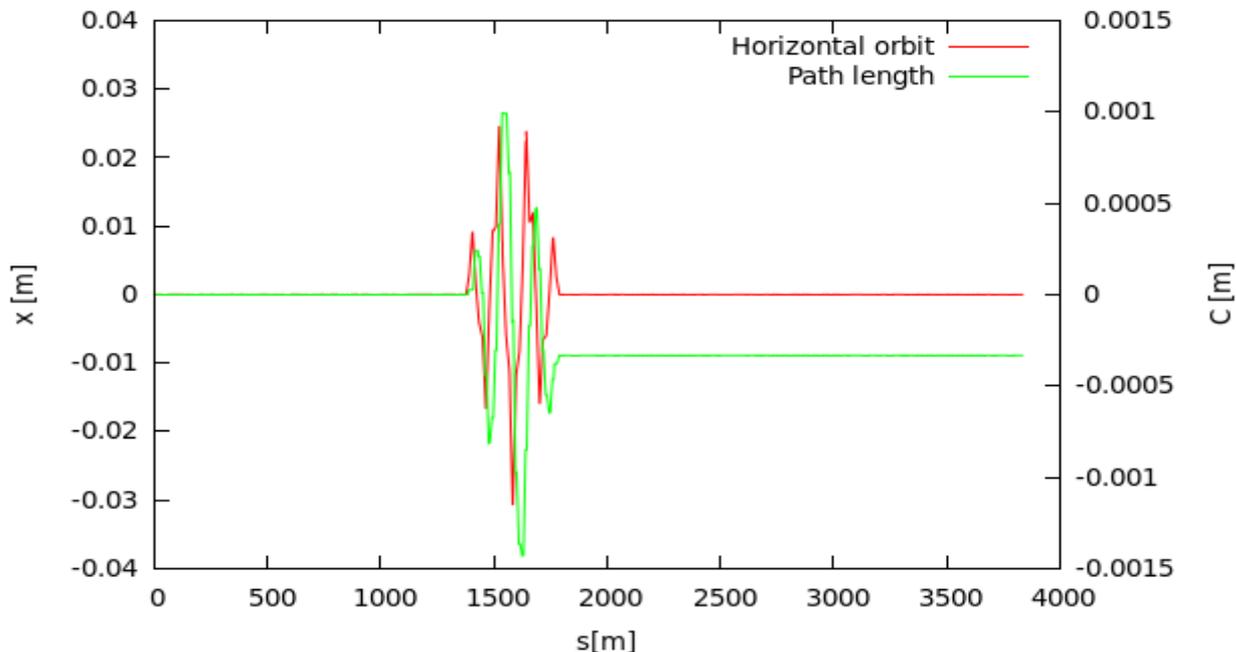


Update on STAR protection bump

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Motivation

- In case of pre-fire the beam is dumped in the STAR triplets causing some damage to the detectors
- Christoph proposed a 30mm bump in the arc between CLOCK10 and CLOCK12 to move the aperture limit to this arc
- This bump was later modified by AI in order to account for strength limitations in the orbit correctors

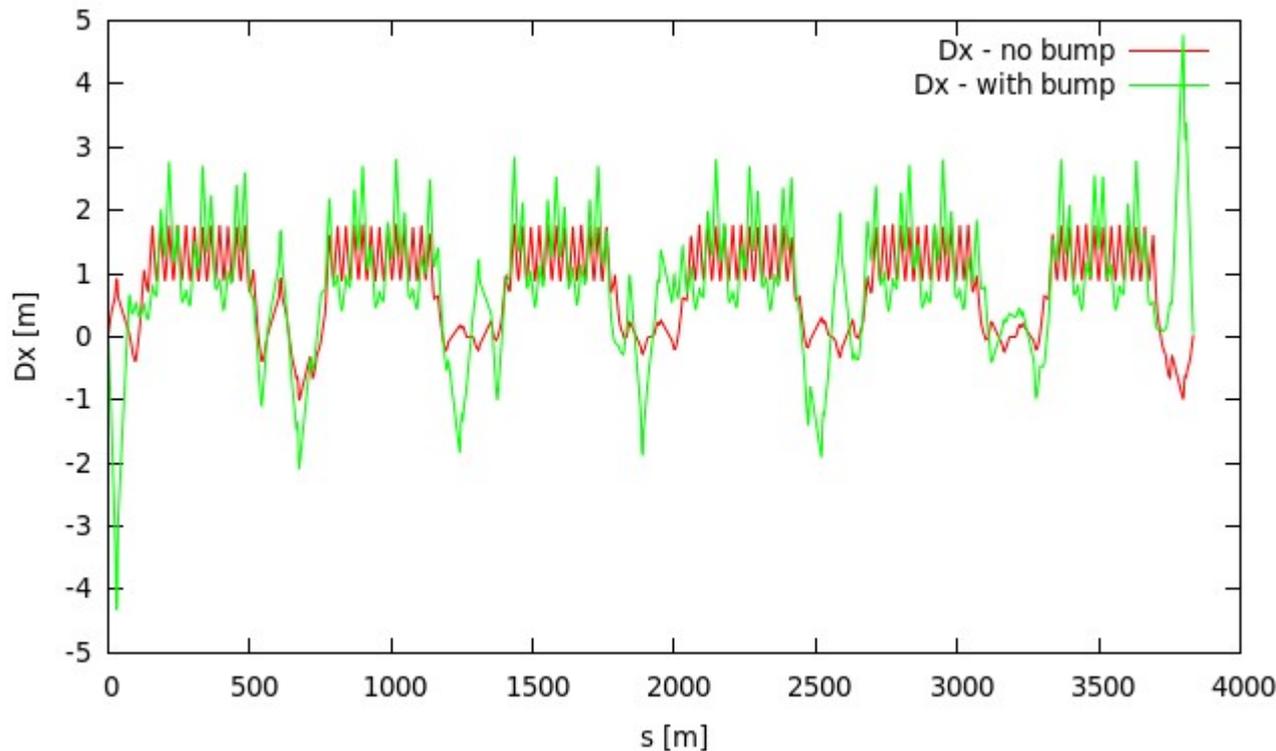


→ Use about 13 correctors
in the arc

→ The path length is decreased
by 0.33mm

Consequences

- Besides the change in path length an orbit bump will introduce dispersion beating all around the ring



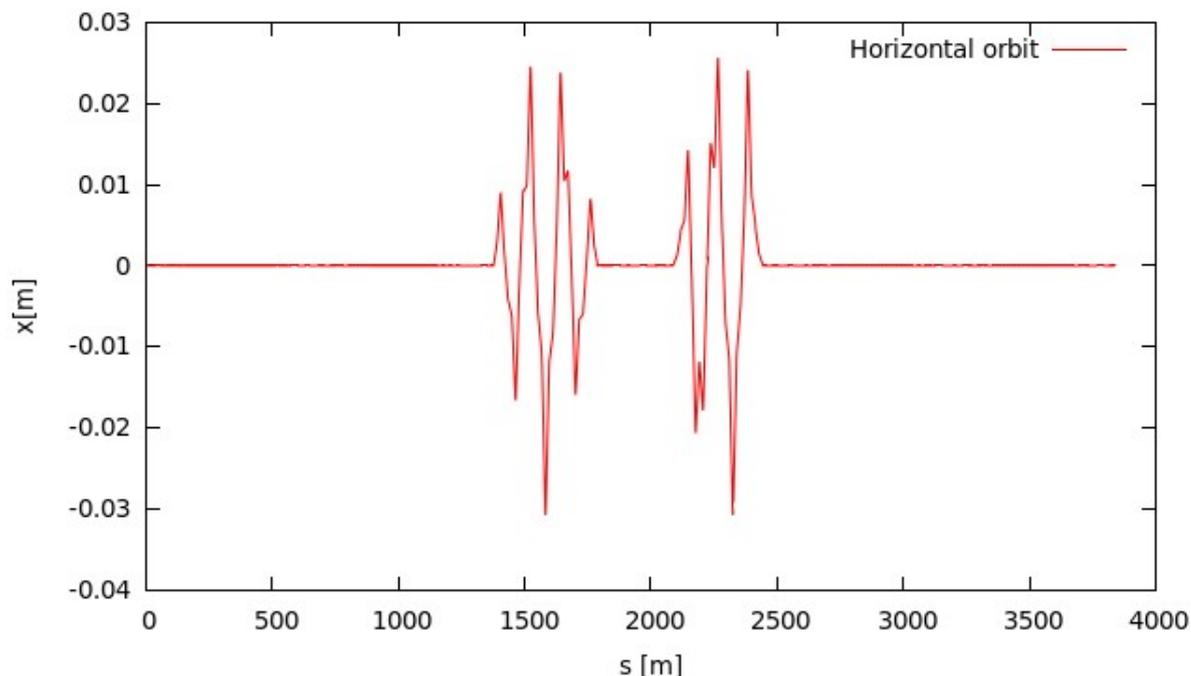
→ Strong beating all around the ring

→ Dispersion peak at 4.5m
In the PHENIX triplets

→ Could lead to poor off-Momentum DA

How can we correct for this?

- Two approaches were studied:
 - Use the IR12 dispersion suppressors: unfortunately not enough strength to fully close the dispersion beating
 - Use a correction orbit bump in an another. Should allow to zero the difference in path length and close the beta-beating bump



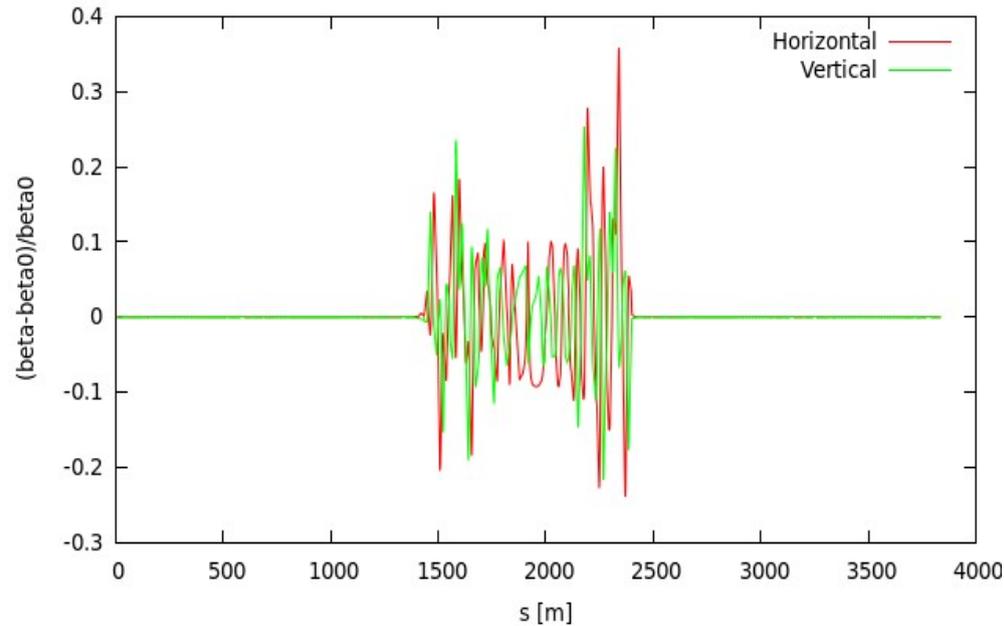
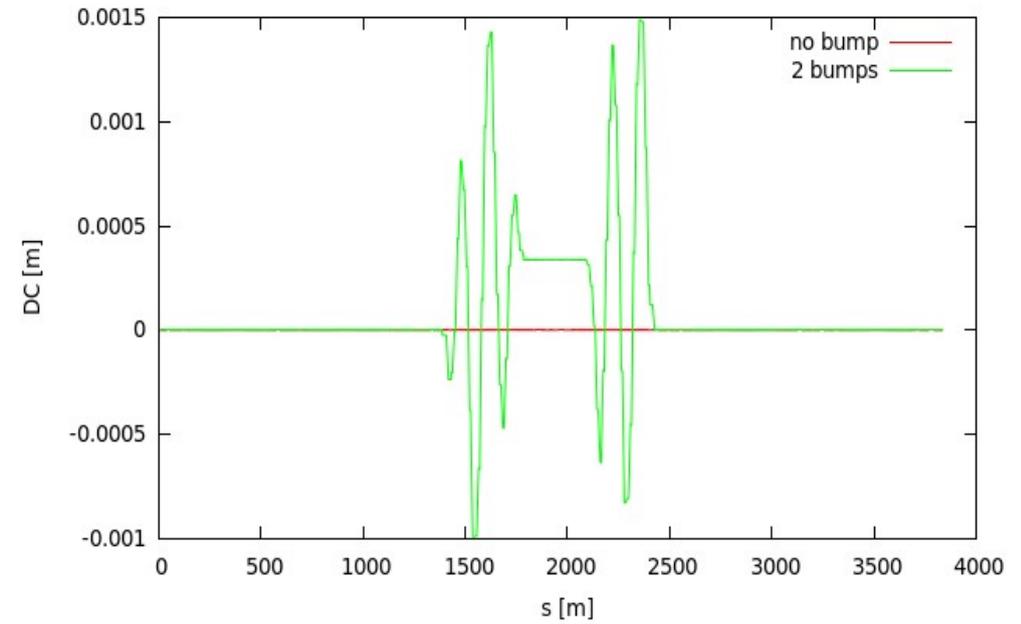
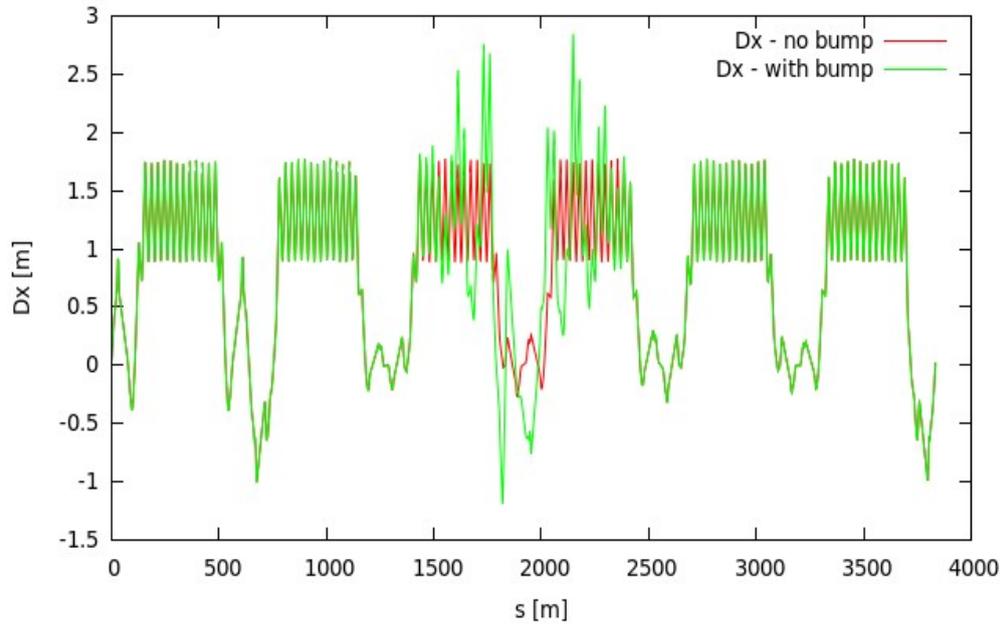
→ Use approximately the Same number of correctors as the original bump

→ Set the maximum excursion at +/-30mm

→ Close dispersion, beta-function and path length

→ Both bumps are closed before entering the triplets – orbit is zero at the cooling elements

Dispersion, beta and path length



→ All distortions contained within the two bumps

→ Dispersion peaks at 2.5m in the arcs

→ Beta-beating peaks at 35% in the arcs

Outlook

- Although contained some distortions will be present in a 3rd of the ring: these bumps should only be seen as a quick fix for this year
- Setup may be complicated: many parameters to be kept under control: we have developed some tools last year for optics corrections in the arcs using orbit bumps: should we try to apply these to generate the correction bump based on measurements? Would need further development to include dispersion and path length
- A test is foreseen this week with smaller bumps in order to check for unforeseen issues
- Possible optimizations: reduce the orbit excursion, number of correctors, which correctors...