Machine Advisory Committee

RHIC Lattice for Cooling

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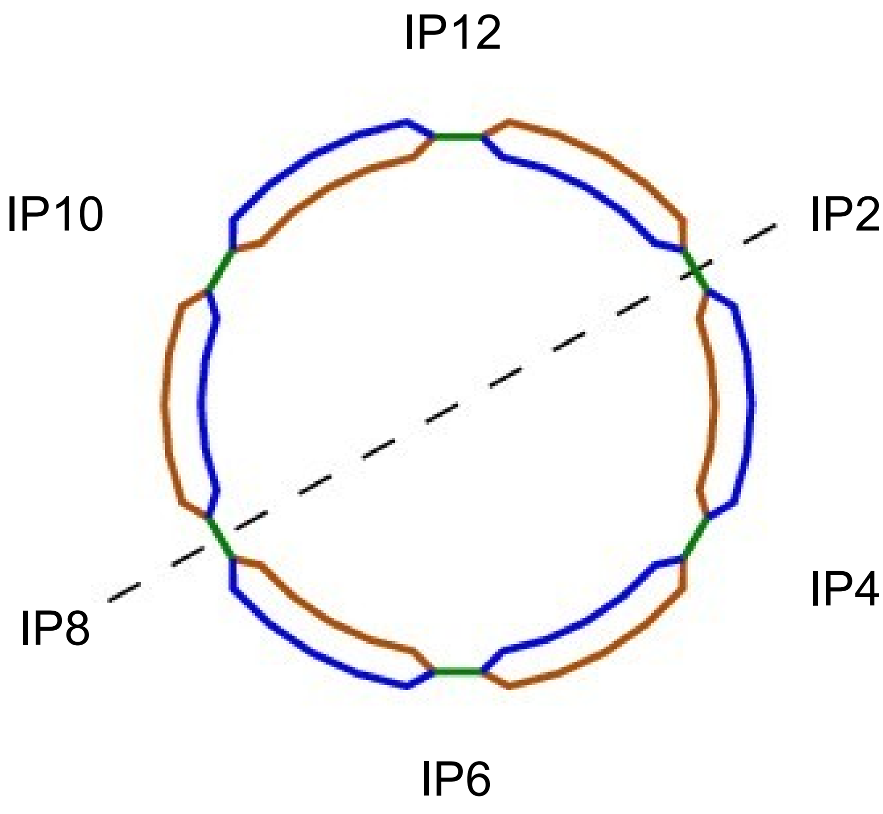
RHIC Lattice for Cooling

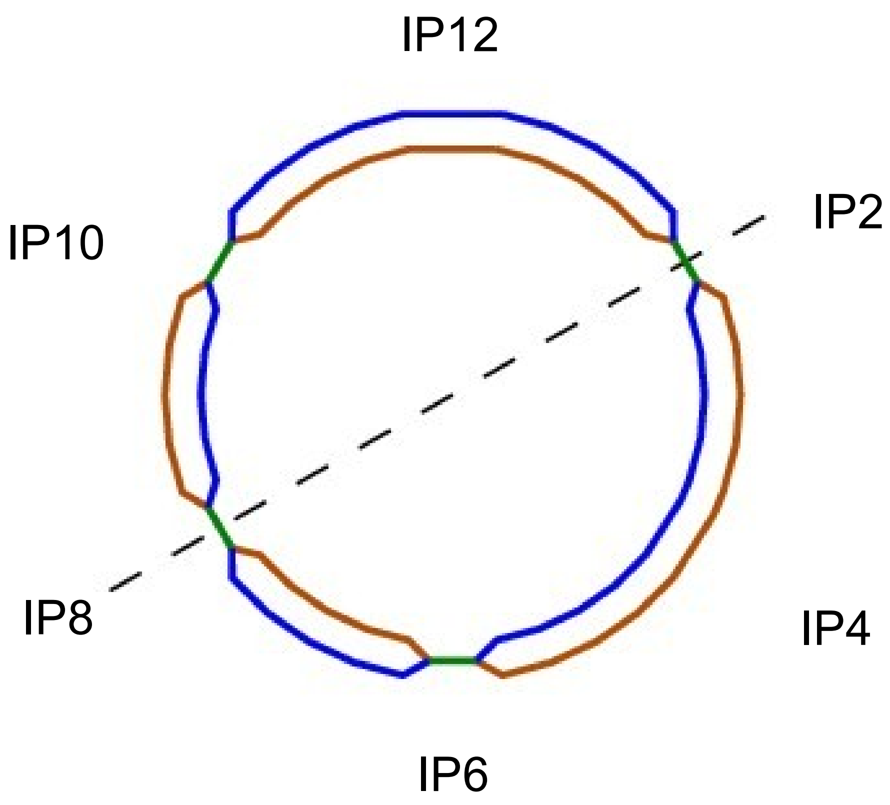
- Layout Geometries for RHIC modification
  - Two approaches, Global and Local
  - Normal operations at Star (IP6) and Phenix (IP8) must be preserved
  - Must be flexible for future plans such as: eRhic
- Matching Large β^* optics at IP
- Summary

RHIC Lattice for Cooling

RHIC: Blue and Yellow beams



Reversing IP12 and IP4, MacKay



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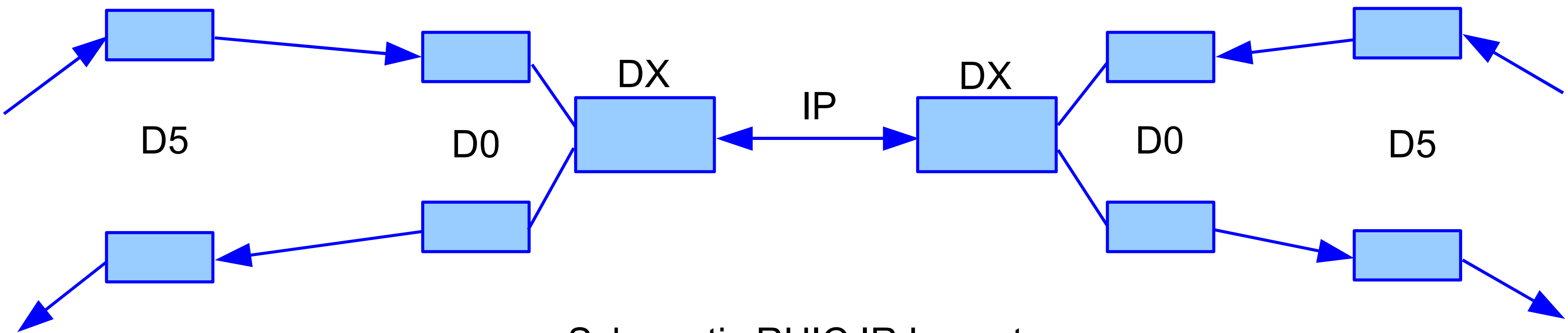
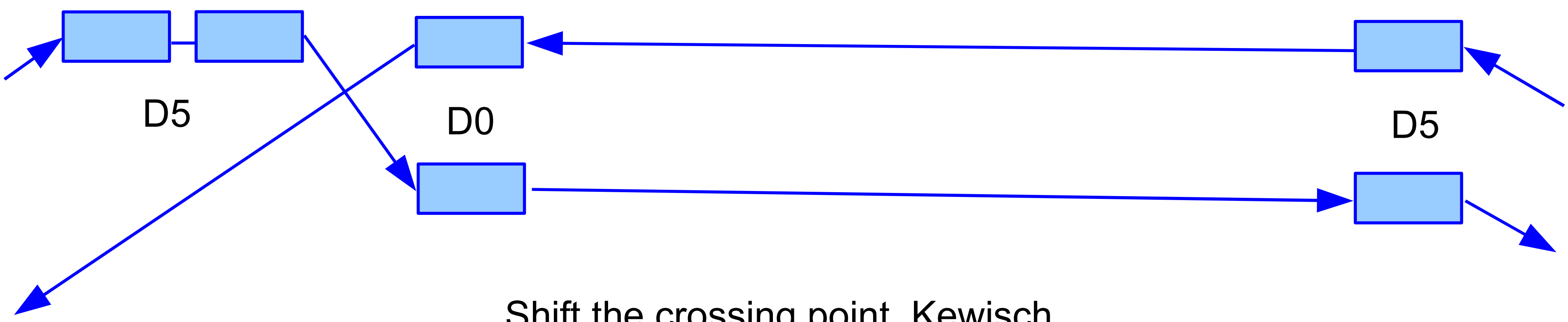


Schematic RHIC IR Layout



Shift the crossing point, Kewisch

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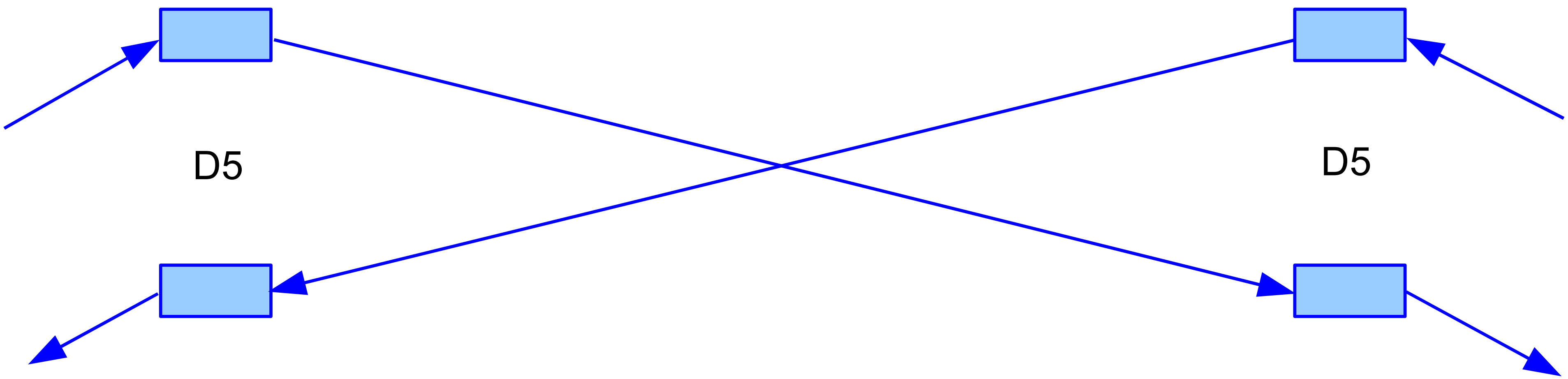

Removal of the crossing dipoles, Roser

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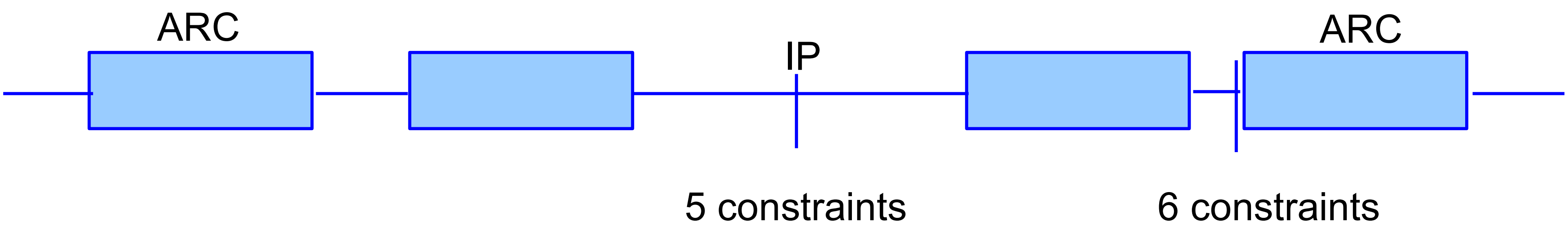
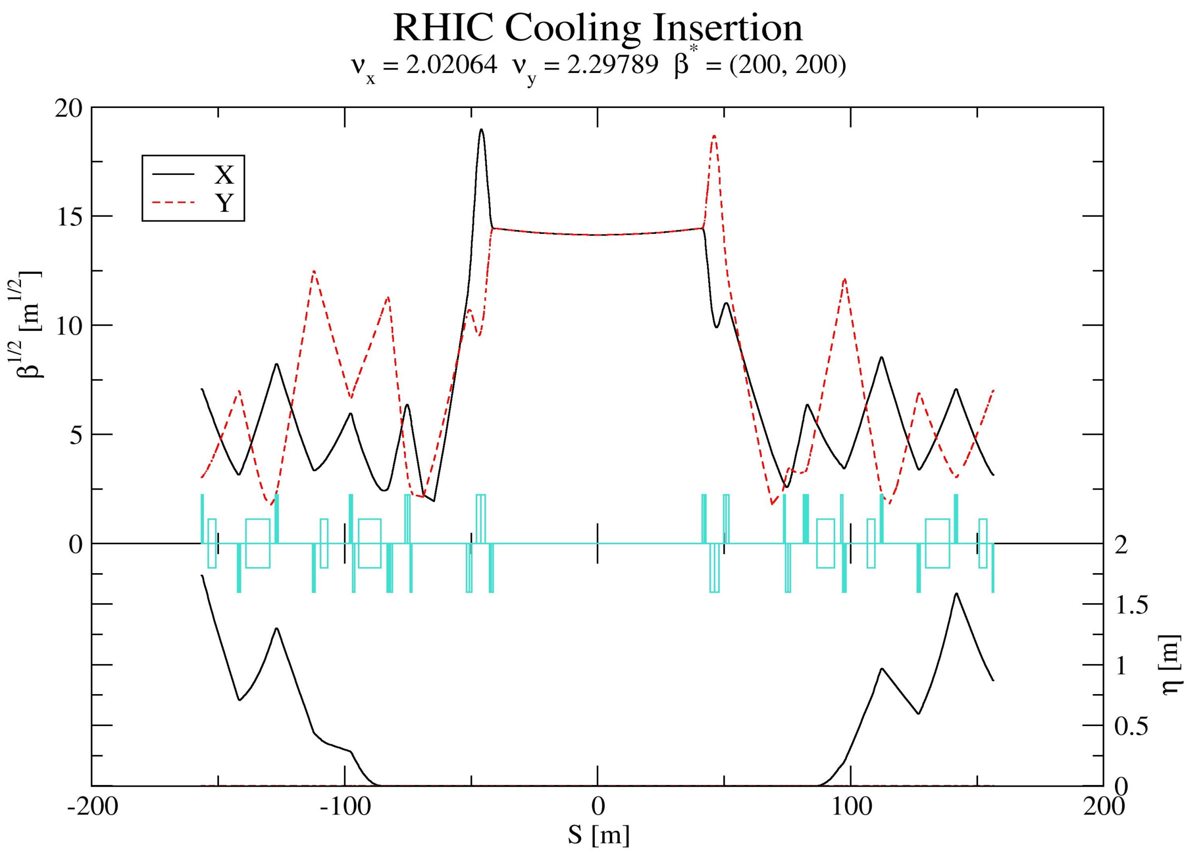


- Constraints at IP for the eCooling
  - Large β^* ($\geq 200m$)
  - Minimize dispersion across the free space (η and η')
  - Minimum of 60*m* free space required
- Matching the end of the insertion to the arcs
  - Each RHIC IR can be treated independently
- Requires sufficient parameters (quadrupole strengths) to vary
- Optics are Anti-symmetric

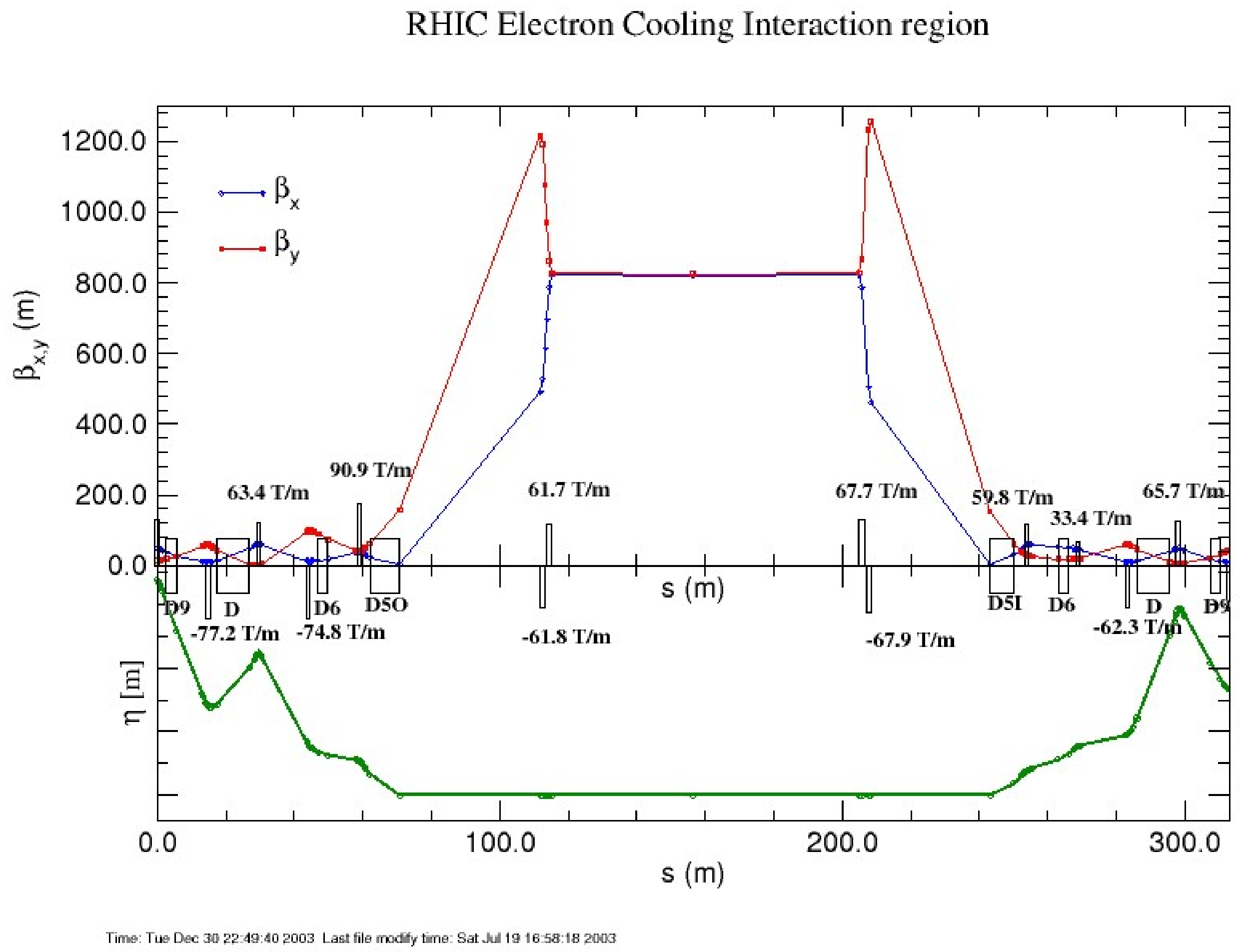
RHIC Lattice for Cooling

- Anti-symmetric triplet
- Large $\beta^* \approx 200m$ with 80*m* physical free space available
- Current in power supplies are exceeded (must be investigated)



RHIC Lattice for Cooling

D. Trbojevic



- Symmetric doublets
- Currents in the quadrupoles exceed power supplies
- Large $\beta^* \approx 800m$ and $80m$ *free space*

Summary

- Requires modification to IR
  - Reuse of existing magnets to reduce cost
- Various geometric layouts are proposed
- Two solutions: $\beta^* \approx 200m$ and $\beta^* \approx 800m$ with $80m$ physical drift space achievable
  - Quadrupole power supply system must be redesigned
- Allow for future modifications: RHIC II, eRhic, etc.