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RHIC Magnet Lattice and Position Nomenclature

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RHIC-AP-14

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I. INTRODUCTION

It has become necessary to adopt a designation which identifies the main magnets and their position in the ring structure. The system of nomenclature presented here is conceived so that equipment other than magnets can be accommodated. The nomenclature for RHIC will be based on the concepts developed for the CBA project. Other systems are conceivable and were discussed for the ISABELLE configuration^{1,2}, but the various machine constraints due to available software and expected control requirements resulted in the system documented by the CBA map³ of the CBA Configuration Management System and Design Handbook.

II. RHIC RING STRUCTURE

1. The two rings will be identified as YELLOW (Y) or BLUE (B). Particles in the Y-ring travel in counterclockwise direction, and clockwise in the B-ring.
2. Each ring is divided into 12 half-sextants with 6 INNER (I) and 6 OUTER (O) half-sextants. The half-sextant is fully identified by:
 - the clock position of its X-ing point
 - the inner/outer position
 - the blue/yellow position.

¹M. Q. Barton, ISA Technical Note No. 85 (1978)

²J. Poole, ISA Technical Note No. 217 (1980)

³BNL photo 4-67-83.

The position of a magnet element is thus given by one of the following set of identifiers.

| | Blue Ring | Yellow Ring |
|-------------|-----------|------------------|
| | :IB2 | :OY2 |
| | :OB2 | :IY2 |
| | :OB4 | :IY4 |
| | :IB4 | :OY4 |
| | :IB6 | :OY6 (injection) |
| (injection) | :OB6 | :IY6 |
| | :OB8 | :IY8 |
| | :IB8 | :OY8 |
| | :IB10 | :OY10 |
| | :OB10 | :IY10 |
| | :OB12 | :IY12 |
| | :IB12 | :OY12 |

3. The 6 quadrupoles in each ring of the arc centers are part of two half-cells. Therefore, they are identified by their clock position

:OY1, :IY3, :OY5, :IY7, :OY9, :IY11
 and :IB1, :OB3, :IB5, :OB7, :IB9, :OB11

III. DIPOLE & QUADRUPOLE MAGNETS

1. The quadrupoles of a half cell are numbered consecutively from Q1, Q2, ..., Q21.

- Q1 through Q9 are insertion quadrupoles,
- Q10 through Q21 are arc quadrupoles.

For example, a quadrupole and its position is thus given by

Q1:OY6, Q20:OY6, Q21:OY5, Q20:OY4

Homologous quadrupoles in the two rings have thus the same name but are distinguished by their location identifier.

2. The 12 arc dipoles are numbered consecutively starting near the X-ing point.

B1, B2, ..., B12

The dispersion suppressor dipoles are BS1 and BS2 and the crossing region dipoles are BC1 and BC2. The dipole location is in general determined as for the quadrupoles. BC1 is common to both rings, however by definition their location is given by the outer ring.

IV. OTHER MAGNETS

Sextupoles and correction magnets are identified by the quadrupole with which they are functionally associated.

V. LOCATION OF OTHER EQUIPMENT

The location of any equipment (vacuum, rf, etc.) is identified by the nearest quadrupole or dipole looking in the direction away from the X-ing point.