

SNS Convention on Coordinate System, Console Display and Magnet Polarity

SNS/AP TECHNICAL NOTE

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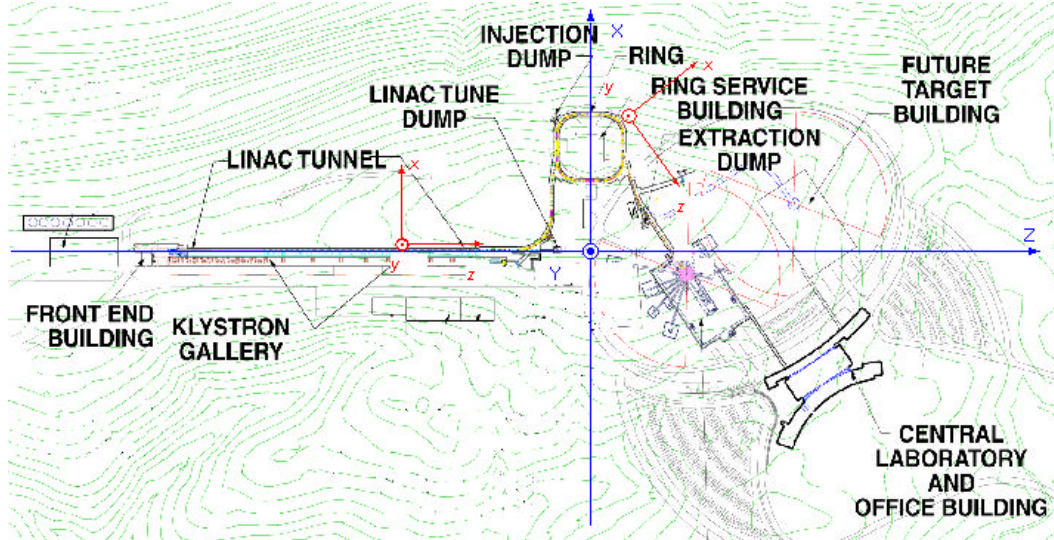
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(compiled by J. Wei, J. Stovall)

1. Global coordinate system

The global system (X, Y, Z), as indicated in blue in the following figure, is defined in technical note SNS/AP/1. The Y direction points vertically up, the X axis is through the Ring center, and the Z axis overlaps the Linac axis.

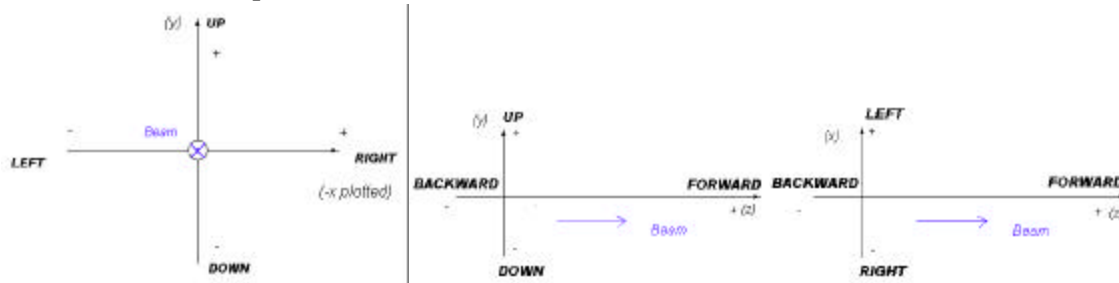


2. Local coordinate system

The local coordinate systems (x, y, z), as indicated in red in the above figure, is defined with the z axis following the reference beam motion, the y axis vertically pointing up, and the x axis determined by the rule of a right-handed (x, y, z) system.

3. Console display

The console display convention is indicated in the following figures. By looking downstream following the beam motion, we defined UP, DOWN, LEFT, RIGHT. FORWARD and BACKWARD correspond to beam direction.



4. Magnet polarity

Each magnet has either A or B (reversal of A) polarity. The A polarity is defined for Linac and HEBT (H⁻ beam) as bending towards negative x (RIGHT) or negative y (DOWN) for dipoles, and focus the H⁻ beam (horizontally) for quads; it is defined for Ring and RTBT (proton beam) as bending the beam towards positive x (LEFT) or positive y (UP) for dipoles, and defocus the beam (horizontally) for quads. Polarity of higher-order multipole magnets is defined accordingly by the bending direction (detailed by a coming technical note). Note that from hardware point of view, the polarity definition remains unchanged through the entire facility from Linac to Ring. The main bending dipole of the ring has a polarity B.