

Measuring DA Using AC Dipole

The logo for the APEX Workshop 2007. It features the text "APEX Workshop 2007" in a stylized, blue, outlined font. The text is centered between two horizontal blue lines that extend across the width of the slide. On the left side, there is a small square image showing a blue, glowing arc, possibly representing a particle beam or a detector component.

APEX Workshop 2007

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Goal

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- Goal:
 - proof the principle of using ac dipole to measure DA
 - calibrate this method against the traditional method
 - 3 production dynamic aperture measurements
 - Explore non-linear resonance driving terms as a function of driven oscillation amplitude
- Motivation:
 - Limited strength of tunemeter kicker at store
 - RHIC ac dipole can achieve a 8σ driven oscillation at store if the driving tune is 0.005 away from the betatron tune.

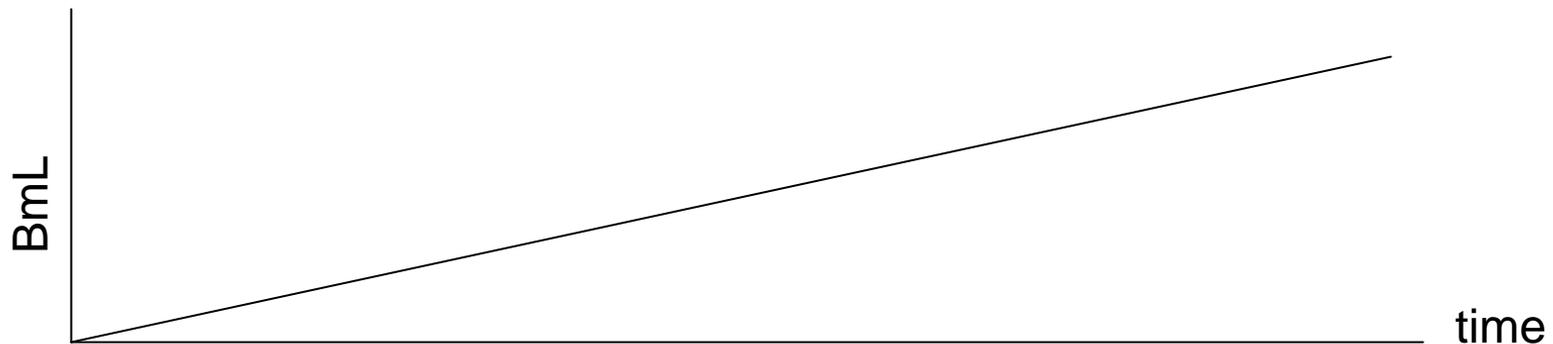
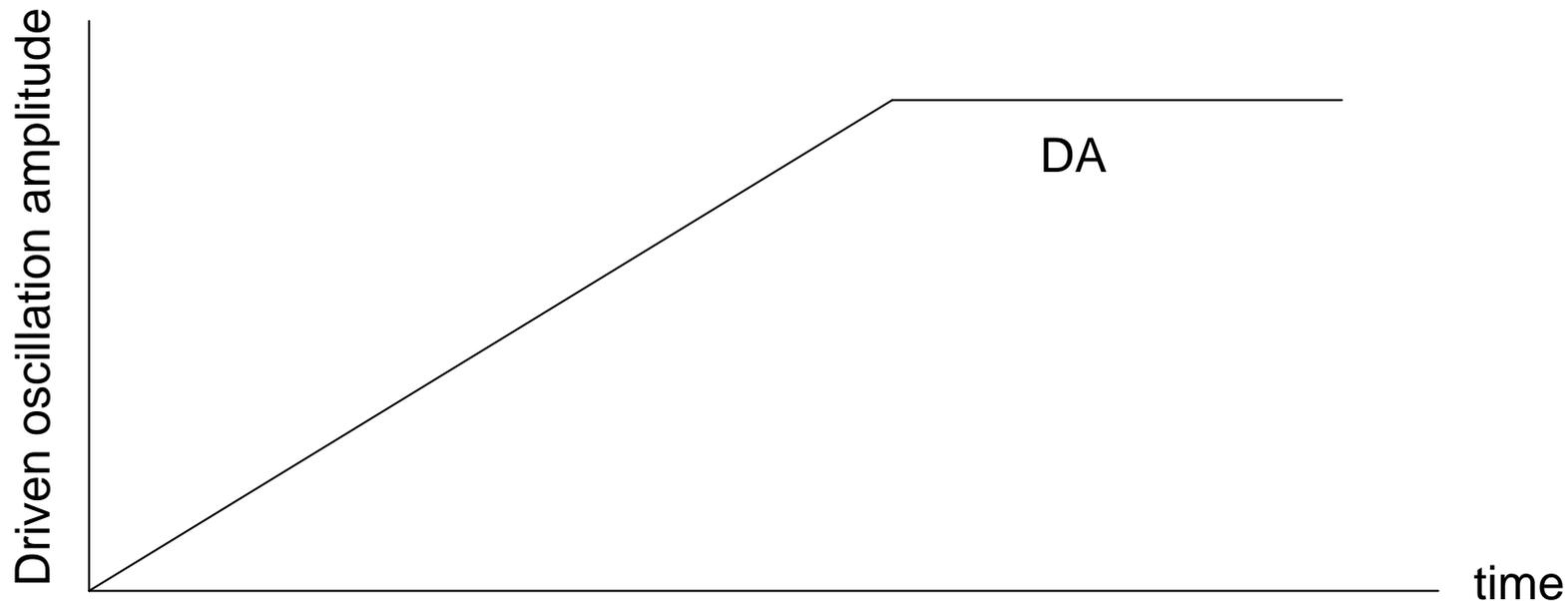
Experiment Description

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- Dynamic aperture measurement
 - At injection:
 - Drive the beam with an ac dipole. The oscillating amplitude of the ac dipole field strength is slowly ramped up. The turn by turn beam position data is recorded as well as the beam losses around ring during the amplitude ramp. In principle, the amplitude of the driven oscillation will saturate once the DA is reached
 - Measure DA with the traditional technique using tunemeter kicker. Compare the two results
 - At store:
 - Repeat the above experiment

Experiment Description

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Experiment Description

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- Non-linear resonance driving term measurement
 - A by-product of DA measurement
 - take the million turn beam position data while the ac dipole field strength gets ramped up. The non-linear resonance driving term can be analyzed by analyzing every 1024 turn by turn data from the million turn bpm data. This allow us to explore the driving term as a function of the driven oscillation amplitude

Beam Time and Experiment Apparatus

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- 6 hours at injection and 6 hours at store if the experiment at injection is successful
- Experiment apparatus:
 - AC dipole
 - Million turn bpms
 - Tune meter kicker
 - IPM
 - Blms