



*Large Hadron Collider Project*

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**Optimisation of the LHC Dynamic Aperture  
via the Phase Advance of the Arc Cells**

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**Abstract**

The phase advances of the arc cells of storage rings are traditionally chosen to be simple fractions of  $\pi$  in order to take advantage of second order achromats they constitute. For the LHC, such a choice is not relevant because of the existence of high order systematic multipole components in the main dipoles. In this case it is better to choose the phase advances to cancel the driving term for the largest possible number of non-linear resonances, which is straightforward for an ensemble of identical cells. This can also be achieved for an actual LHC arc featuring dispersion suppressors. The associated improvement of the dynamic aperture is shown in this paper.

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