



PS Transfer Line Dispersion Mismatch

Simulation Updates

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For the following simulations, only the following values differ between simulations.
'Lattice' values are given by PTC.

Case	D_{x_0}	D'_{x_0}
Lattice	2.35	-0.00744
Operational	2.633	-0.1104
ReMatched	2.683	-0.012

Table: Optics cases used for simulations.

Initial Distribution: Dispersion Vector

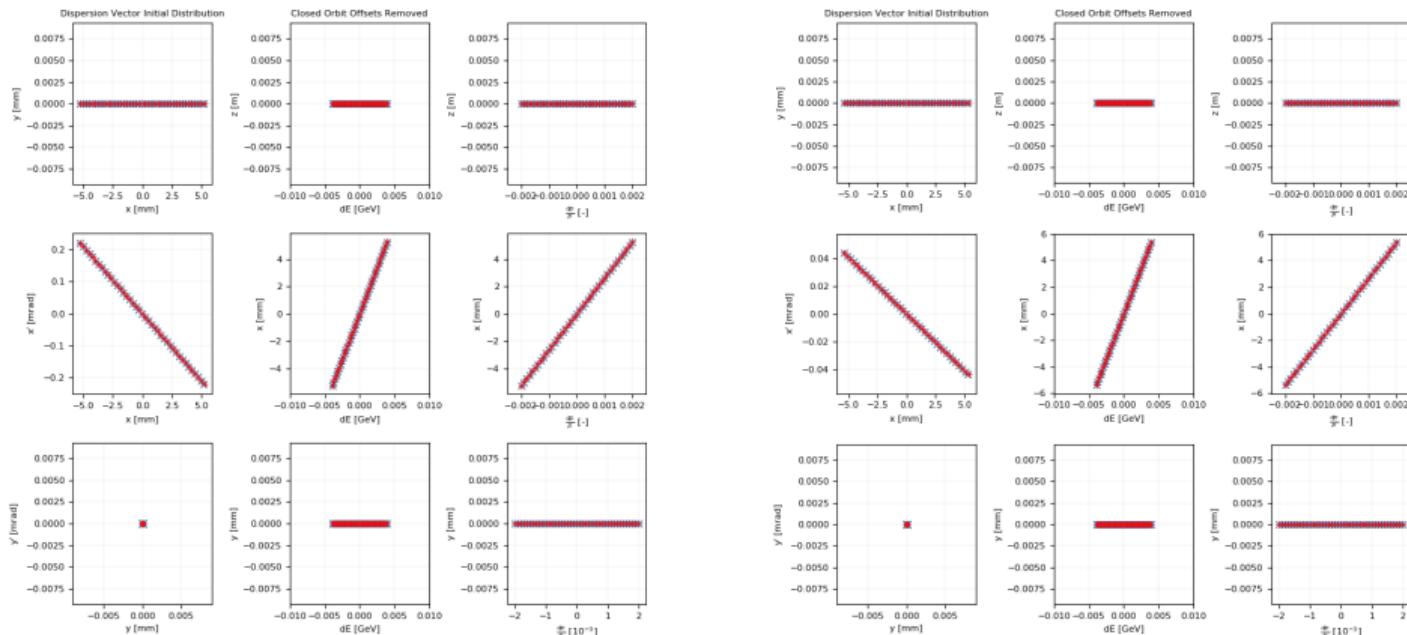


Figure: Identical initial distribution, red points generated by M. A. Fraser, corresponding PyORBIT distribution is shown in blue. Operational optics (left) are compared to ReMatched optics (right)

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Dispersion Beating

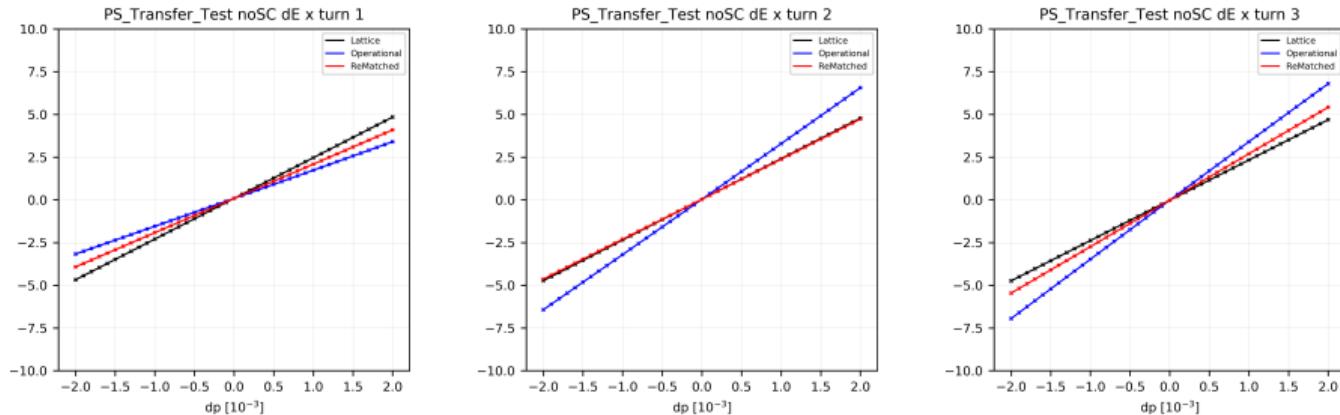


Figure: Dispersion vector plots for first 3 turns for all simulation cases.

Fitting Dispersion Vector

Fit cubic to dispersion vector (dE , x) to find linear, and non-linear dispersion:

$$y = bx^3 + ax^2 + mx + c \quad (1)$$



Dispersion Beating

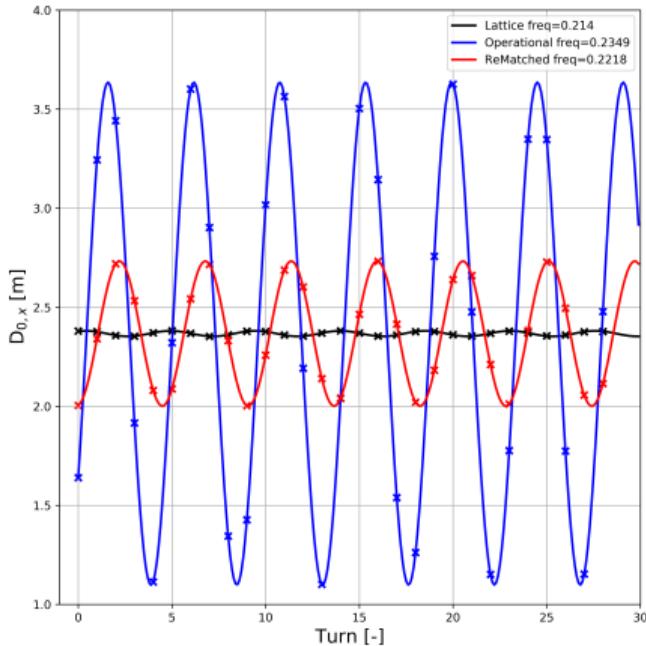


Figure: Dispersion beating for three cases, with indicated frequency of beating (performed with NAFF).

Normalised Dispersion Beating: Extracting Linear & Non-Linear Parts

Fit (turns, linear dispersion) with linear fit:

$$a + b \cos(cx + d) \quad (2)$$

Fit (turns, non-linear dispersion) with non-linear fit:

$$a + b(x - 1) \cos(c(x - 2) + d) \quad (3)$$

Normalised Dispersion Beating

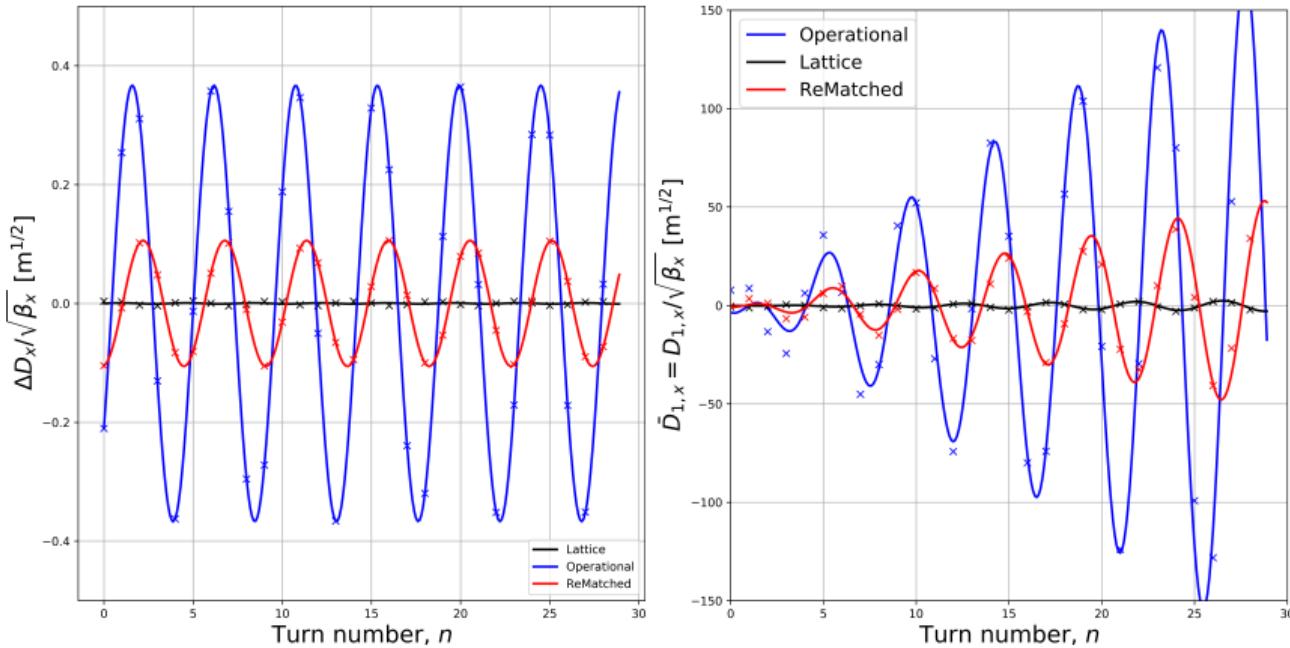


Figure: Linear (left) and non-linear (right) dispersion beating for three cases.

Three Optics Scenarios: Fitting Parameters

Case	D_{x_0}	D'_{x_0}	M_D
Lattice	2.35	-0.00744	0.00082
Operational	2.633	-0.1104	0.3669
ReMatched	2.683	-0.012	0.1058

Table: Optics cases used for simulations, with fit parameter M_D .

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