

IP Coupled Matrix

Had 6 measurement. Three are good.

	Case 1		Case 2		Case 3	
	Value	$\pm\sigma$	Value	$\pm\sigma$	Value	$\pm\sigma$
α_1	0.00176	0.01068	0.00147	0.03946	0.01762	0.00940
β_1	10.184	0.142	10.108	0.212	9.941	0.126
α_2	0.02397	0.00756	0.01478	0.01473	0.00773	0.00582
β_2	9.737	0.109	9.673	0.205	9.519	0.112
a	-0.0336	0.0070	-0.0398	0.0059	-0.0341	0.0035
b	0.4383	0.8573	0.9132	0.6877	1.2221	0.3278
c	-0.0048	0.0085	-0.0096	0.0069	-0.0147	0.0032
d	-0.0542	0.0081	-0.0386	0.0158	-0.0538	0.0062
χ^2	1.56		4.92		0.94	

Case 2

Two solutions found

Yellow-IP2-Auonly15-e0-injection-19082-2015-05-20-13-18-42.ctm -- Coupled Transfer Matrix

Summary Model Solver

Initial Guess

Simplex Lmdif BFGS Powell ConjGrad TNC SLSQP

Model Base Tunes

Q_1	0.23497006064	Q_2	0.224234912555
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Model Twiss Parameters and Coupling

α_1	β_1	a	b
0.00146741288745	10.108190192	-0.0397727872461	0.913174203887
α_2	β_2	c	d
0.0147753607098	9.67331986359	-0.00962242694162	-0.0386465360403

Waist

β_1^w	10.1081684261	S_1^w	0.0148328566169	β_2^w	9.67120852964	S_2^w	0.142895594525
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Model Beam Transfer Matrix

0.096165813	10.057641	-0.0066676659	-0.014981238
-0.098528415	0.093792301	0.0010397423	-0.00021008106
-0.0050559619	0.10592592	0.17454816	9.5464364
-0.00023429755	0.0015508041	-0.10207171	0.14644619

Model and Measurement Differences

Device	ΔQ_1	ΔQ_2
q1e	-0.07274	0.8289
q1b	0.2321	-0.8098
q2b	-0.4419	0.2325
q3b	-0.672	0.2574
q3e	-0.5791	-0.6515
q2e	0.835	1.139
χ^2		4.923243695

Open Save Measure Evaluate Edit Tunes Off Quit

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Model Base Tunes

Q_1	0.23497006064	Q_2	0.224234912555
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Model Twiss Parameters and Coupling

α_1	β_1	a	b
0.00073202760665	10.1211809517	-0.0492958184429	-0.880563299352
α_2	β_2	c	d
0.0144279130268	9.67143508084	0.00924728224858	-0.0477481661467

Waist

β_1^w	10.1211755281	S_1^w	0.00740897989834	β_2^w	9.66942224871	S_2^w	0.139509583224
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Model Beam Transfer Matrix

0.095843807	10.072457	-0.0005328036	0.085774871
-0.098381107	0.094136918	-0.00041765139	-0.0042373735
-0.0022884344	-0.030794589	0.17502587	9.5454774
0.00080650898	-0.0057880487	-0.1020816	0.14594587

Model and Measurement Differences

Device	ΔQ_1	ΔQ_2
q1e	-0.09782	0.8258
q1b	0.1733	-0.8178
q2b	-0.3389	0.1531
q3b	-0.4183	0.2197
q3e	-0.6588	-0.6562
q2e	0.7696	1.144
χ^2		4.51829031

Open Save Measure Evaluate Edit Tunes Off Quit

Case 3

Two solutions found.

Yellow-IP2-Auonly15-e0-injection-19082-2015-05-20-13-32-27.ctm -- Coupled Transfer Matrix

Summary Model Solver

Initial Guess

Simplex Lmdif BFGS Powell ConjGrad TNC SLSQP

Model Base Tunes

Q_1	0.235185298363	Q_2	0.224686168769
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Model Twiss Parameters and Coupling

α_1	β_1	a	b
0.0176239450915	9.94088518263	-0.0340846910139	1.22205141986
α_2	β_2	c	d
0.00773248808556	9.51927858928	-0.0147437687323	-0.0537975240598

Waist

β_1^w	9.93779846823	S_1^w	0.175143214535	β_2^w	9.51870945258	S_2^w	0.073603307432
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Model Beam Transfer Matrix

0.1143811	9.8827737	-0.021723481	-0.21323311
-0.10036918	0.074064483	-0.00050821384	0.013308543
-0.017682219	-0.056422031	0.16589726	9.3755941
-0.0024001033	0.014820379	-0.10407786	0.14831895

Model and Measurement Differences

Device	ΔQ_1	ΔQ_2
q1e	-0.5816	0.06069
q1b	0.4376	-0.1052
q2b	-0.02701	0.01601
q3b	-0.03713	0.02233
q3e	-0.428	0.1728
q2e	0.2827	-0.3155
χ^2		0.9399087388

Open Save Measure Evaluate Edit Tunes Off Quit

Yellow-IP2-Auonly15-e0-injection-19082-2015-05-20-13-32-27.ctm -- Coupled Transfer Matrix

Summary Model Solver

Initial Guess

Simplex Lmdif BFGS Powell ConjGrad TNC SLSQP

Model Base Tunes

Q_1	0.235185298363	Q_2	0.224686168769
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Model Twiss Parameters and Coupling

α_1	β_1	a	b
0.0146023770768	9.98909796765	-0.047051540317	-1.26850091916
α_2	β_2	c	d
0.00955805041765	9.54389135583	0.011717781684	-0.060504616923

Waist

β_1^w	9.9869684522	S_1^w	0.145833479193	β_2^w	9.54301954061	S_2^w	0.0912126619058
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Model Beam Transfer Matrix

0.10776577	9.9716789	-0.018034209	-0.048736098
-0.099448245	0.080409928	-0.0021730131	0.01250387
-0.018554123	-0.21184982	0.16421414	9.436996
-0.00066624955	0.010254148	-0.10338614	0.15027195

Model and Measurement Differences

Device	ΔQ_1	ΔQ_2
q1e	-0.5497	0.1051
q1b	0.387	-0.1538
q2b	0.0874	-0.02331
q3b	0.04595	-0.04079
q3e	-0.3916	0.291
q2e	0.213	-0.4992
χ^2		1.031133522

Open Save Measure Evaluate Edit Tunes Off Quit

Summary

- The errors are fairly large
- Method requires several measurements to get reliable results
 - Only way for choosing between the multiple solutions
- Haven't analyzed with the Raw Artus data yet
- Needs to be tested with a coupled machine