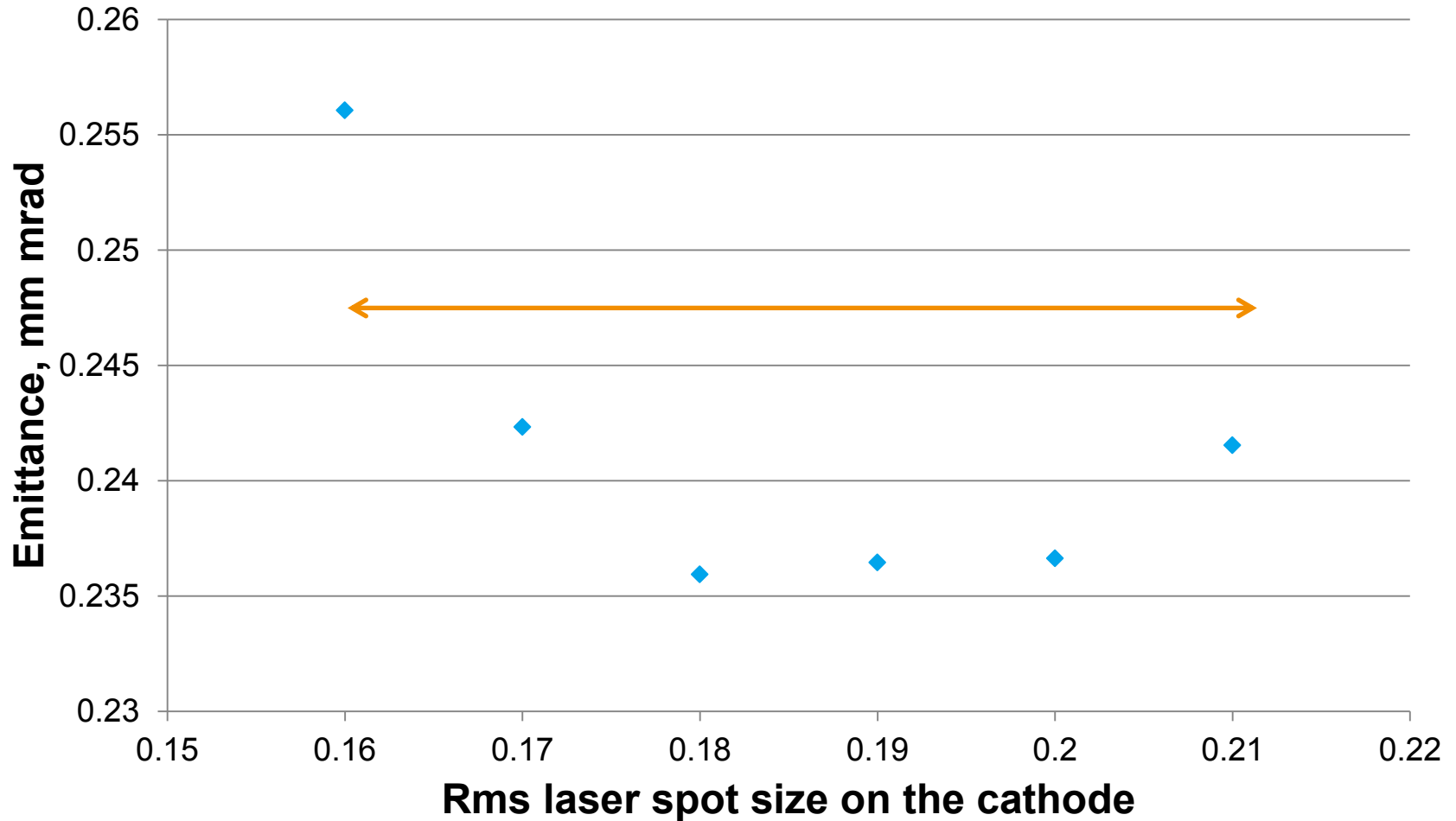


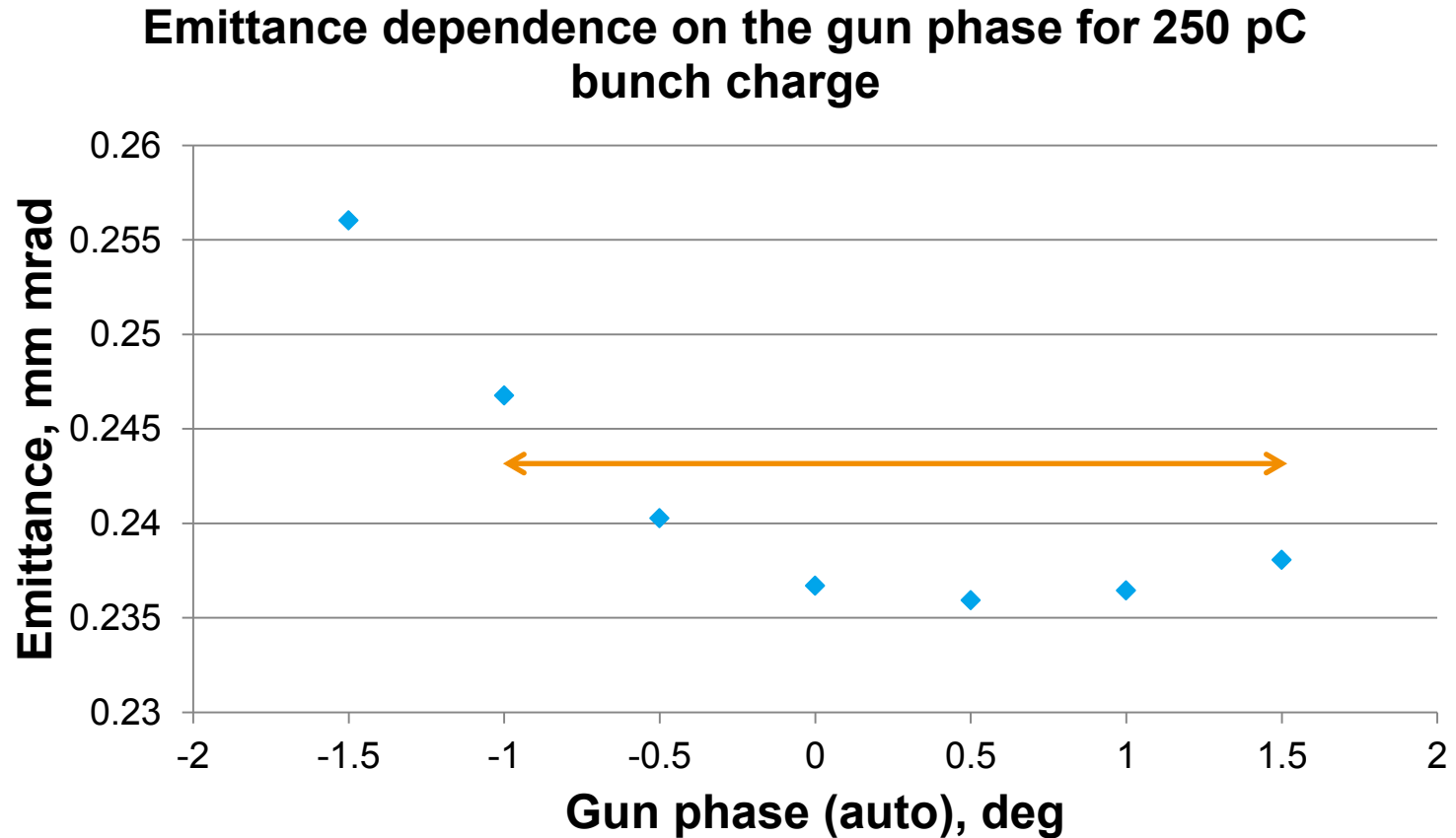
Emittance optimization for various machine parameters at PITZ for 250 pC bunch charge

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PITZ Colloquium
Zeuthen, 1.11.2011

Parameter	Value	Unit
Bunch charge	0.25	nC
Flat top laser temporal profile, FWHM	21.5	ps
Flat top laser temporal profile, rt/ft	2	ps
Uniform laser transverse profile, rms	[0.16;0.01;0.2]	mm
Gun accelerating gradient	60.58	MV/m
Gun launching phase w.r.t. auto MMMG phase	[-1.5;0.5;1.5]	deg
Main solenoid current	[367;1;393]	A
Booster on-axis peak field	[0;1;25]	MV/m
Booster launching phase w.r.t. MMMG phase	0	deg

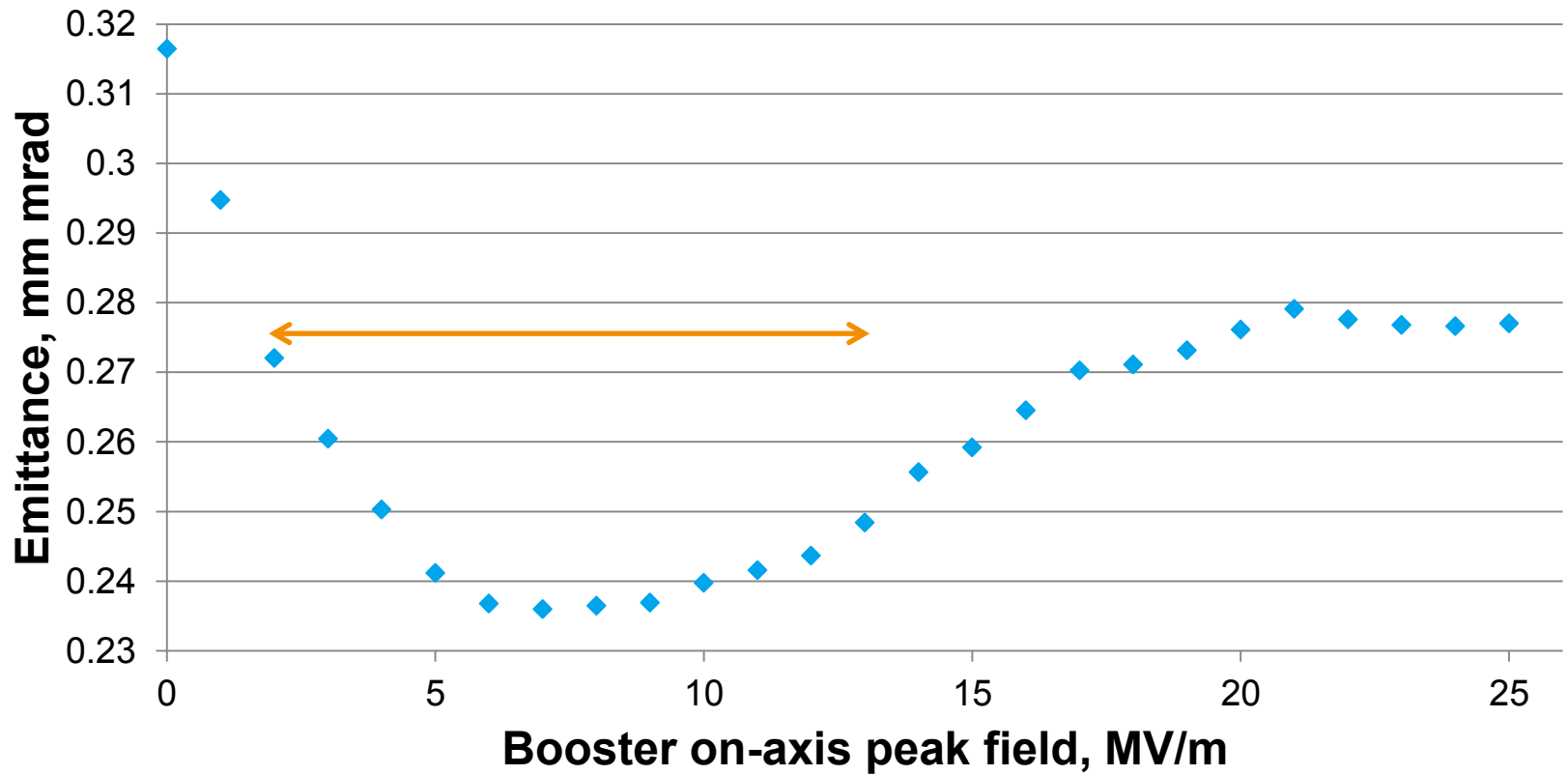
Emittance dependence on rms laser spot size on the cathode for 250 pC bunch charge

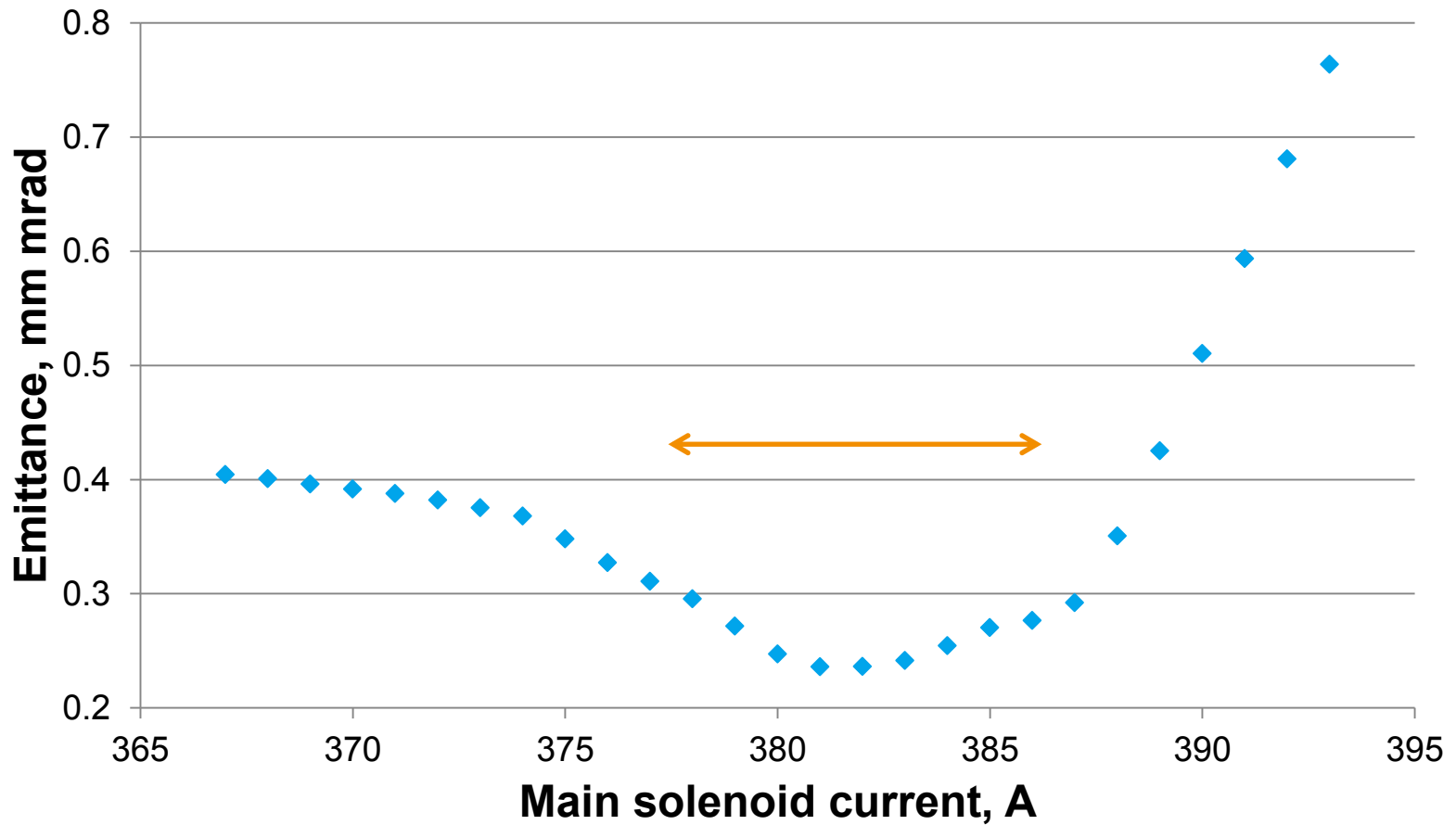




MMMG phase calculated by ASTRA using tracking of the single particle →
real MMMG phase most probably shifted by 0.5 deg → to be checked

Emittance dependence on booster peak field for 250 pC charge





Parameters giving best emittance value

Parameter	Value	Unit
Bunch charge	0.25	nC
Flat top laser temporal profile, FWHM	21.5	ps
Flat top laser temporal profile, rt/ft	2	ps
Uniform laser transverse profile, rms	0.18	mm
Gun accelerating gradient	60.58	MV/m
Gun launching phase w.r.t. auto MMMG phase	0	deg
Main solenoid current	381	A
Booster on-axis peak field	7	MV/m
Booster launching phase w.r.t. MMMG phase	0	deg
Emittance at EMSY1	0.236	mm mrad
Thermal emittance	0.153	mm mrad
(Thermal emittance) / (emittance at EMSY1)	0.65	