

A Plan for Optics Working Group

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The Tentative Goal

- Establish at least one **consistent** design of optics by the review in September:
 - Arc, IR, solenoids, dynamic aperture, synchrotron radiation, sawtooth, emittance tuning must be included and evaluated.
 - Start with a parameter set at Z and tt for the time being (next page).

The tentative parameters

parameter	FCC-ee crab waist (2 IPs)	
	Z	t
E_{beam} [GeV]	45.5	175
current [mA]	1450	6.6
$P_{\text{SR,tot}}$ [MW]	100	100
no. bunches	45154	51
N_b [10^{11}]	0.66	2.6
ϵ_x [nm]	0.13	2
ϵ_y [pm]	1.0	2
β_x^* [m]	0.5	0.5
β_y^* [mm]	1	1
RF frequency [MHz]	400	
RF voltage [GV]	0.4	11
circumference [km]	100	
mom. comp. [10^{-5}]	0.5	
synchrotron tune	-0.03	-0.07
$\sigma_{z,\text{SR}}$ [mm]	1	2.31
$\sigma_{z,\text{tot}}$ [mm] (w beamstr.)	2.8	2.83
$\sigma_{\delta,\text{SR}}$ [%]	0.037	0.202
$\sigma_{\delta,\text{tot}}$ [%] (w beamstr.)	0.127	0.248
θ_c [mrad]	30	
Piwinski angle	5.3	1.8
L^* [m]	2	
beam-beam param. ξ_x/IP	0.07	0.06
beam-beam param. ξ_y/IP	0.18	0.18
luminosity/IP [$10^{34} \text{ cm}^{-2}\text{s}^{-1}$]	247	11

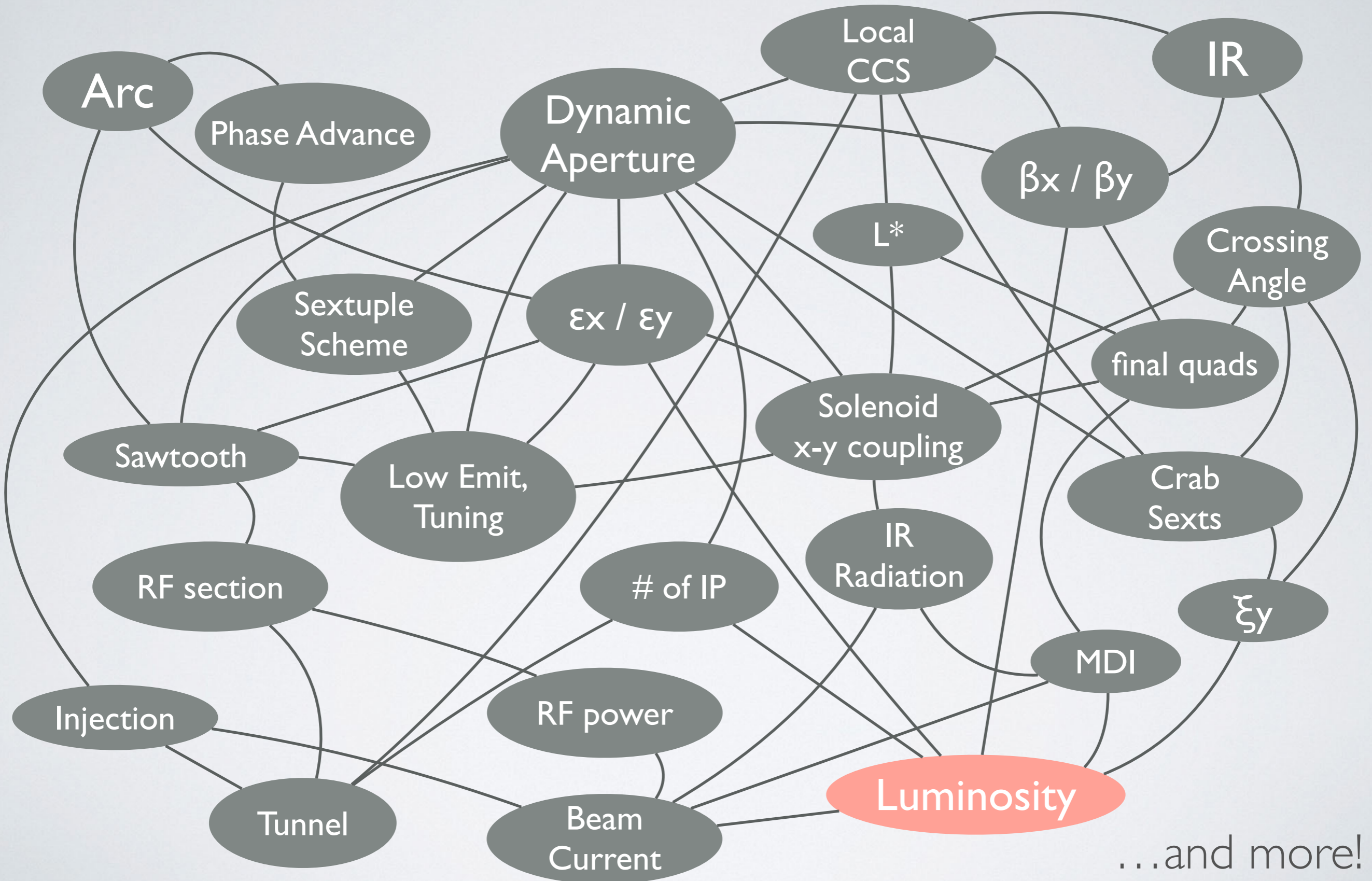
- These are working assumptions, not decisions. No intention to exclude other possibilities.
- Based on IPAC'15 CW parameters^(*).
- 2IP, crab waist.
- Z and tt will be considered so far as the extreme.
- Z and tt have a common lattice, scaled with the beam energy.
- It is assumed that non-crab waist will be done just by turning-off the crab sexts. No change in the lattice.
- These parameters will be reconsidered depending on the results of optics study by the end of July.

^(*)F. Zimmermann

Schedule

- 12 June: A mini-review with BINP colleagues
- End of July: The first integration: revisit the parameters
- September: The second integration & the review

Complexity, as usual



Questions on the modeling

- A computer code which can handle a tilted solenoid, which may overlap with quadrupoles, is necessary. It must also calculate the synch. radiation in the solenoid and its fringe.
- Can MAD-X do it?
 - If not, what should we do?
 - Modify MAD-X?
 - PTC?