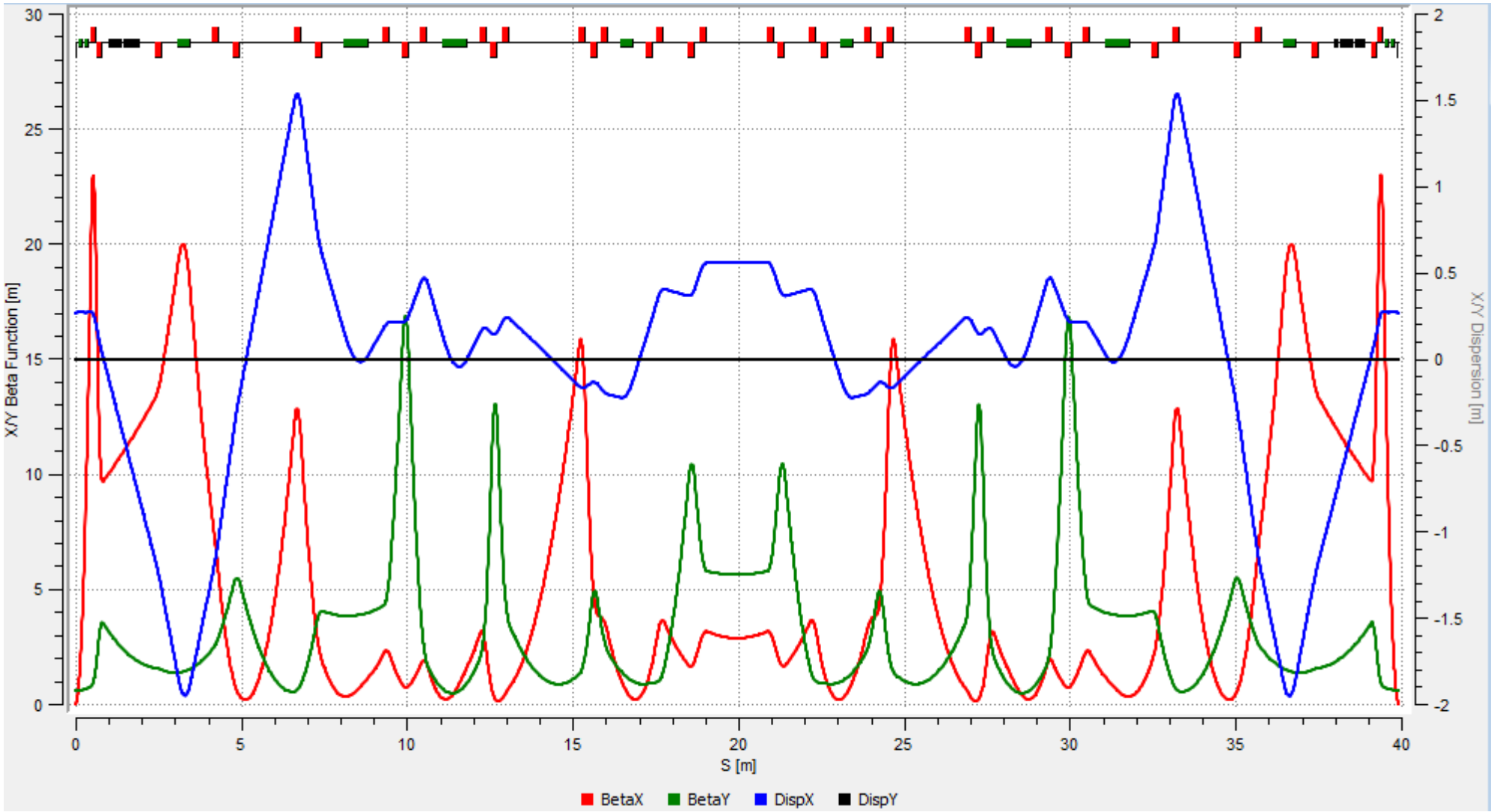
IOTA Optics

Main Parameters of IOTA storage ring for OSC

Circumference	40 m
Nominal beam energy	100 MeV
Bending field	4.8 kG
Transverse emittances, $\varepsilon = \varepsilon_x = \varepsilon_y$, rms	4.5 nm
Rms momentum spread, σ_p	$1.17 \cdot 10^{-4}$
SR damping times (ampl.), τ_s / ($\tau_x = \tau_y$)	1.3 / 1.6 s

Main parameters of cooling chicane

Delay in the chicane, Δs	2 mm
Horizontal beam offset, h	22 mm
M_{56}	4.1 mm
D^* / β^*	265 mm / 11 mm
Cooling rates ratio, $(\lambda_x = \lambda_y)/\lambda_s$	1.25
Cooling ranges (before OSC), $n_{\sigma x}/n_{\sigma s}$	5.6 / 9.2
Dipole: magnetic field *length	3.43 kG * 12 cm
Strength of central quad, GdL	0.9 kG


X/Y Beta Function [m]
X/Y Dispersion [m]
S [m]
BetaX
BetaY
DispX
DispY

Main parameters of OSC

Undulator parameter, K	0.8
Undulator period	11.7 cm
Radiation wavelength at zero angle	2 μm
Number of periods, *m*	6
Total undulator length, L_w	70 cm
Length from OA to undulator center	1.65 m

Passive cooling

Amplifier gain (amplitude)	N/A
Operating band	[2 – 3] μm
Telescope aperture, 2*a*	14 mm
Damp. rates (*x*=*y*/*s*)	9/7 s^{-1}

Active cooling

Amplifier gain (amplitude)	10
Amplifying medium	CrZnSe
Operating band, FWHM	(2.4±0.3) μm
Telescope aperture, 2*a*	5 mm
Damp. rates (*x*=*y*/*s*)	~20/15 s^{-1}

Table of parameters for OSC in IOTA, Valeri Lebedev, May 2015