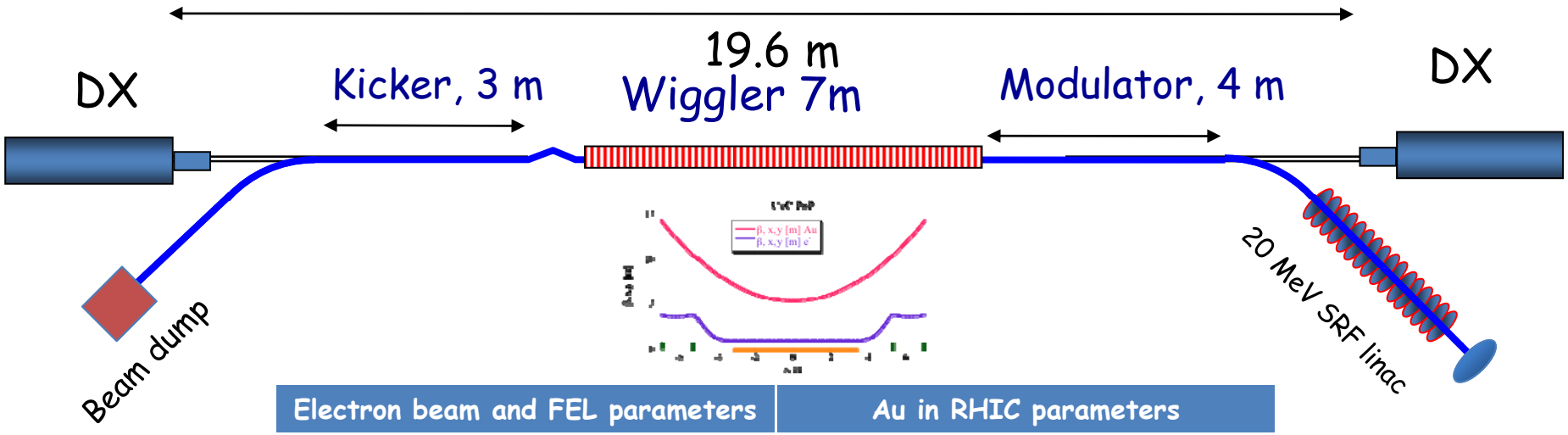
APEX for CeC Optics Development

- Objective: develop and test the lattice for proof of principal experiment of CeC.
  - 40 GeV Au at store
  - 5.5 meters of $\beta^*_{x,y}$ at IP 2
- Before APEX: develop and upload the lattice file (next Tuesday)
- Items to be done APEX:
  - Test physical apertuduring re at injection (June 8th, 1~2 hours)
  - Develop the ramp (June 22nd, 4 hours+1 hour to test magnets)
  - Tune scan to find optimized working point (June 22nd,1 hours)
  - Measure $\beta^*_{x,y}$(K variation/ ac dipole) (June 22nd, 1 hour)
  - Meausre transverse emittance (IPM) , bunch lengthes…

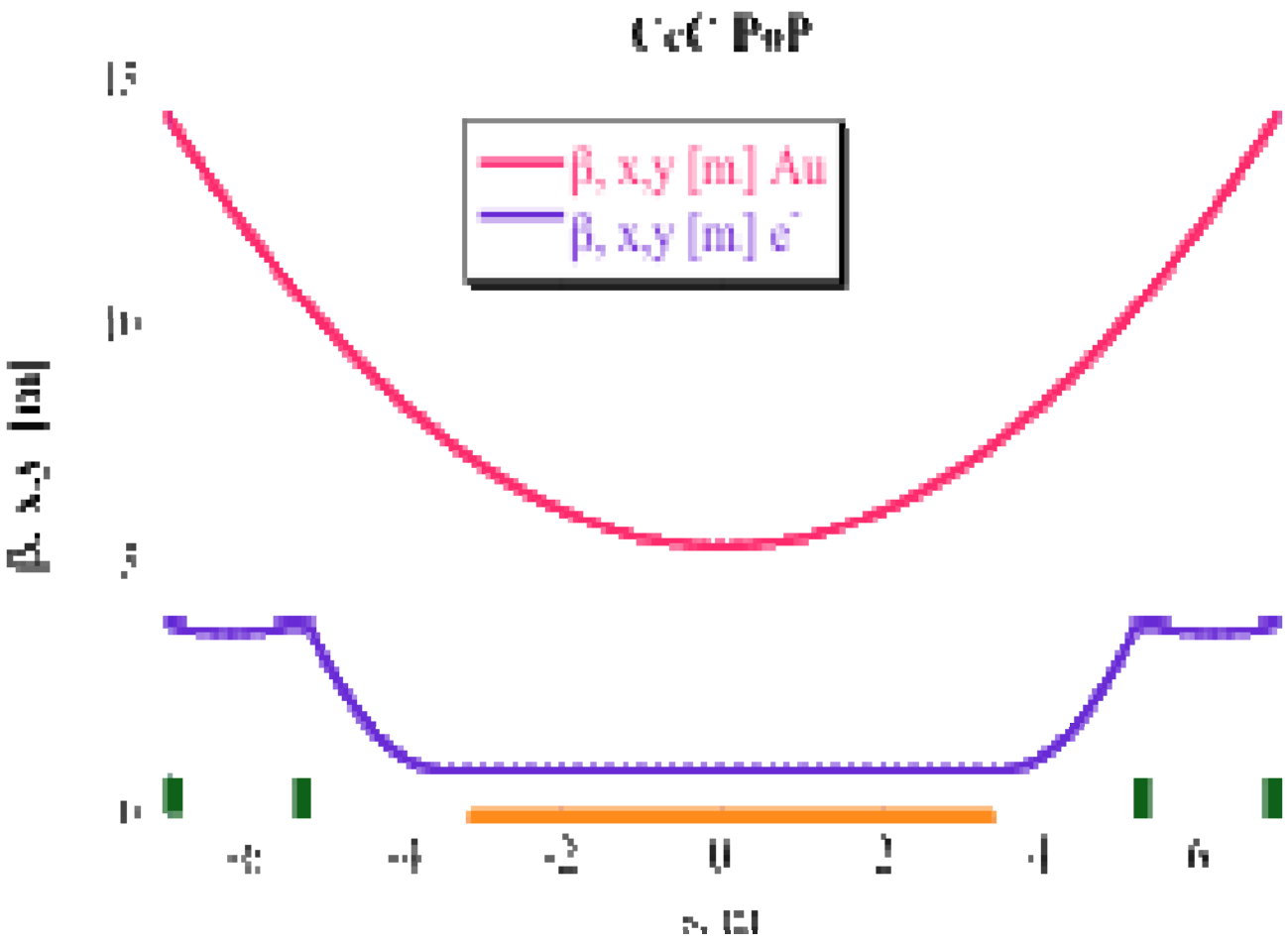
- Injection test (June 8th)
  - Use local orbit bump to shift beam and measure injection losses. (1~2 hour) (can be parasitic to other experiments).
- Total beam time and bunch pattern?
  - Ramp development/lattice verification 5 hours + 2 hours (total 6~7 hours)
  - Both blue and yellow (Depends on whether others want a ring at this energy)
  - Intensity 1E9 / bunch
  - 12x12 (ok with BBQ and tune feedback for Au)
- Need GRD to measure feedback matrices.

- Personnel needed
  - Steve Tepikian, develop and upload lattice file (Next Tuesday)
  - Al, approve it for feedback to work
  - Don Bruno, test magnets
  - Vadim, injection test $\beta^*_{x,y}$
  - Guillaume, measure feedback matrices
  - The team + operations, develop the ramp
  - Vadim, Mei, measure $\beta^*_{x,y}$

Parameters



Electron beam and FEL parameters		Au in RHIC parameters	
Energy (MeV)	21.8	Energy (GeV / u)	40
RMS Energy Spread	1×10^{-3}	RMS Energy Spread	3.5×10^{-4}
Bunch Charge (nC)	0.5-1	Bunch Intensity	1×10^{-9}
Norm. Emittance (μm)	5	RMS Norm. Emit. (μm)	2
Peak Current (A)	60-100	Long. Emittance (eV-s)	0.5
Bunch Charge (nC)	0.5-1	RMS Bunch Length (ns)	1.5
Undulator length (m)	7	β* (m)	5.5
Undulator Period (m)	0.04	S* (m)	0
Undulator Strength	0.437		
FEL wavelength (μm)	10		


β, x,y [m] Au
β, x,y [m] e⁻