



# **ATF2 milestones for discussion**

**Andrei Seryi, Toshiaki Tauchi**

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# What are natural milestones for ATF2?

- ATF2 design:
  - Nominal IP  $\beta_y^* = 0.1$  mm &  $L^* = 1$  m  $\rightarrow$  this give ~same chromaticity as ILC with  $\beta_y^* = 0.4$  mm and  $L^* = 4$  m
  - Nominal  $\gamma\epsilon_y = 3e-8$  m (or  $\epsilon_y = 12$  pm) gives  $\sigma_y^* \sim 37$  nm
- However, the ILC design  $\sigma_y = 5.7$  nm at 250 GeV, and if this is rescaled to 1.28 GeV, it gives  $\sigma_y \sim 80$  nm
  - (ILC gets 5.7 nm with  $\gamma\epsilon_y = 4e-8$  m, and if it is  $\gamma\epsilon_y = 3e-8$  at in ATF2 nominal, then the size scaled to 1.28 GeV is 70 nm)
- Two milestones suggested for ATF2 commissioning:
  - 1) “ILC scaled beam size”:  $\sim 75$  nm at ATF2
    - (Happen to be about what was achieved at FFTB)
  - 2) “ILC-chromaticity” or “ATF2 design”:  $\sim 37$  nm at ATF2



# Milestones & beam requirements

- The first milestone, “ILC-scaled” beam of 75 nm could be achieved with ~4 times larger either  $\varepsilon_y$  or  $\beta_y$ 
  - $\gamma\varepsilon_y=12e-8m$  ( $\varepsilon_y=48$  pm) and  $\beta_y=0.1$  mm
    - This case is likely excluded, due to IP divergence limitation
  - $\gamma\varepsilon_y=3e-8m$  ( $\varepsilon_y=12$  pm) and  $\beta_y=0.4$  mm
  - More likely both  $\gamma\varepsilon_y$  and  $\beta_y$  need to be increased, x2:
  - $\gamma\varepsilon_y=6e-8m$  ( $\varepsilon_y=24$ pm) and  $\beta_y=0.2$  mm
- The 37nm milestone would need more tuning of DR and of the extraction line for lower 12pm emittance
- (Note: best achieved ATF emittance is  $\varepsilon_y\sim 5$ pm)
  - Hope we can reach and extract it, for squeezed beta studies



# Schedule, based on milestones

- Criteria for the schedule:
  - Results for ILC TDP expected in 2010
    - May move intermediate ATF2 milestones, but hopefully would not delay the final goal
  - ATF2 schedule need to be realistic,
  - but it also need to be aggressive
  - Schedule needs to be sequential
    - tasks towards future milestones should not cause delays in reaching earlier milestones
  - We also need to make sure that schedule is compatible with other non-ATF2 planned activities
- Next slide: very tentative schedule for discussion:

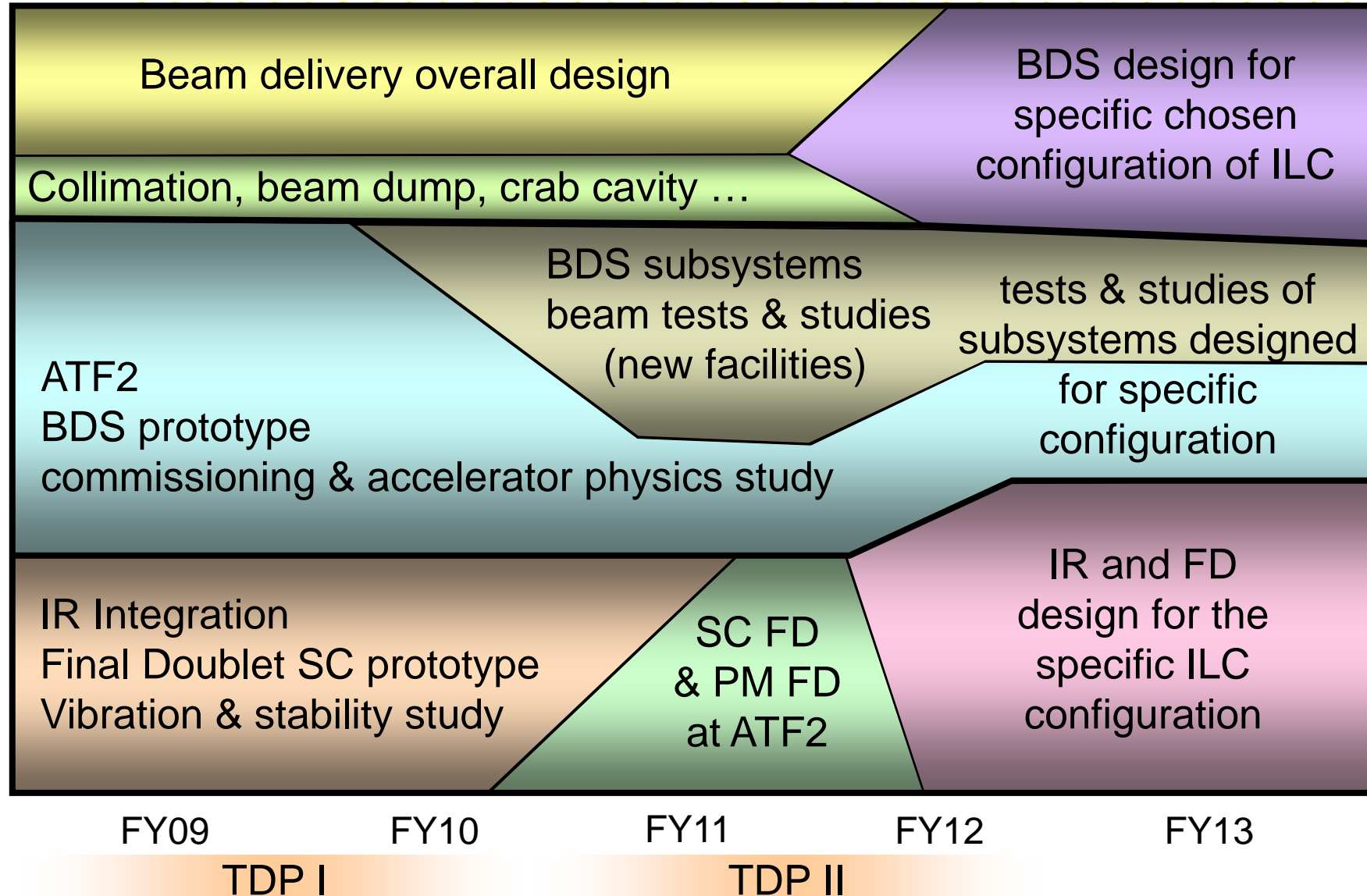
# ATF2 milestones

	2009										2010									
	dec	jan	feb	mar	apr	may		oct	nov	dec	jan	feb	mar	apr	may		oct	nov	dec	
BSM Laser Wire mode commissioned	■																			
First test of fast kicker		■																		
Observe several micron beam size			■																	
Achieve $\epsilon_y=24\mu\text{m}$ beam in DR			■																	
BSM $8^\circ$ (0.25-1.5 $\mu\text{m}$ ) commissioned				■																
Observe sub micron beam size				■																
BSM $2^\circ$ mode (1-6 $\mu\text{m}$ ) commissioned				■																
Achieve $\epsilon_y=24\mu\text{m}$ beam in DR				■																
Extract and preserve of $\epsilon_y=24\mu\text{m}$					■															
BSM $30^\circ$ (70-400nm) commissioned					■															
First observation of ILC-scaled $\sigma_y=75\text{nm}$						■														
Achievement of $\epsilon_y < 12\mu\text{m}$ in DR						■														
Repeat observation of 75nm beam							■													
Extract & preserve $\epsilon_y=12\mu\text{m}$ beam								■												
BSM $174^\circ$ (20-100nm) commissioned									■											
First observation of design 37nm beam										■										
Fast kicker system fully commissioned											■									
Monalisa installed on beamline												■								
Reliable observation of 37nm beam												■	■	■						
First tests of mild beta squeeze													■							
Achieve 2nm resolution of IP BPM														■						
Evaluate IR position stability to nm level														■						
Commissioning of Monalisa														■						
Commissioning of FONT feedback																	■			
Observe of nm stability of IP position																		■		
Initial tests of squeezed $\beta$ -function																			■	

VERY TENTATIVE



# Beam Delivery plans





# Discussion of milestones & schedule

- If we agree with this (or adjusted) schedule
  - then we need to make detailed plans for sub-systems
    - ATF ring
    - Control and tuning software
    - Shintake monitor
    - Monalisa
    - FONT
    - Ring BPM upgrade
    - etc.
  - and for overall ATF program
  - ... so that the plan could become reality
- Also need to make detailed plans for further ATF2 program such as tests of SC FD and PM FD, etc
- Let's discuss it



## Adjustments of schedule during this week

- Thanks for comments on the draft schedule
- Some possible schedule conflicts, hopefully, eased
  - Commissioning schedule of BSM group is adjusted, based on discussion with Kamiya-san
    - Mode 8 deg – March, 30deg – April, 174deg – Summer and Autumn
  - Discussion with BSM and Monalisa groups, resulted in suggestion to move installation of Monalisa system from Summer 2009 to January 2010
    - Monalisa will be fully tested without beam (possibly, on a FD-BSM mockup) before installation on a beamline
- Many other similar issue may exist and need to be identified and resolved





## More comments...

- Plan for 21 weeks of operation per year
  - About 50% for ATF2
  - Another 50% for other ATF R&D program, DR, linac upgrade and maintenance
- Presently, it is difficult to operate during weekends, because there are not enough sub-shift leaders
- Maybe some colleagues from collaborators could be qualified for sub-shift leaders, so that continuous operation could be provided
  - This could in principle increase duration of operation from 21 weeks \* 4.5 days (typical, if beam starts Monday afternoon) to 21\*7, that means by 50%!
  - This will also make machine more stable and ease the work