Cavity Tuner

Spec. profile for Plug Compatibility

H. Hayano

Jan 18, 2008 ILC-SCRF meeting@DESY

Spec. Profile Table (Slow tuner) @Oct.2007 GDE meeting/FNAL

tuner	specification item	Rough guess	unit and comments	further comments
Slow tuner	Tuning range	>600	kHz	
	Hysteresis in Slow tuning	<10	μm	
	Motor requirement	step-motor use, Power-off Holding, magnetic shielding		
	Motor specification	ex) 5 phase, xxA/phase, …	match to driver unit, match to connector pin asignment,…	
	Motor location	insdie 4K? / outside 300K? / inside 300K accessible from outside?	need availability discussion, MTBF	
	Magnetic shielding	<20	mG at Cavity surface, average on equater	discuss later
	Heat Load by motor	<50	mW at 2K	discuss later
	Physical envelope	do not conflict with GRP, 2-phase line, vessel support, alignment references, Invar rod, flange connection,…		cable connection, conflict with Mag shield
	Survive Frequency Change in Lifetime of machine	~20 Mio. steps	could be total number of steps in 20 years,	

Spec. Profile Table (Fast tuner) @Oct.2007 GDE meeting/FNAL

Fast tuner	Tuning range	>1	kHz over flat-top at 2K	
	Lorentz detuning compensation	<100	Hz at 31.5MV/m flat-top	
	Actuator specification	ex) low voltage piezo 0-1000V, …	match to driver unit, match to connector pin asignment, …	decide later
	Actuator location	insdie 4K?/inside 4K accessible/inside 100K? accesible / inside 300K accessible from outside?		decide later
	Magnetic shielding	<20	mG at Cavity surface average	
	Heat Load in operation	<50	mW	measure first, discuss later
	Physical envelope	do not conflict with GRP, 2-phase line, vessel support, alignment references, Invar rod, flange connection,…		
	Survive Frequency Change in Lifetime of machine	$>10^{10}$	number of pulses over 20 years, (2x109:operational number)	

Spec. items to be determined

- Slow tuner: Motor specification
- Slow tuner: Motor Location
- Slow tuner: magnetic shielding
- Slow tuner: Heat load by Motor
- Fast tuner: actuator specification
- Fast tuner: actuator Location
- Fast tuner: Heat load by actuator

‘Motor/actuator location’ is a big topic to be discussed.
(RDR baseline is not yet specified,
Noguchi is proposing Motor outside & actuator accessible, for maintenability.
Higashi and Saito are proposing actuator at high temperature location.)