

Stability measurements of ATF-DR beam and Extracted beam

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ATF Introduction

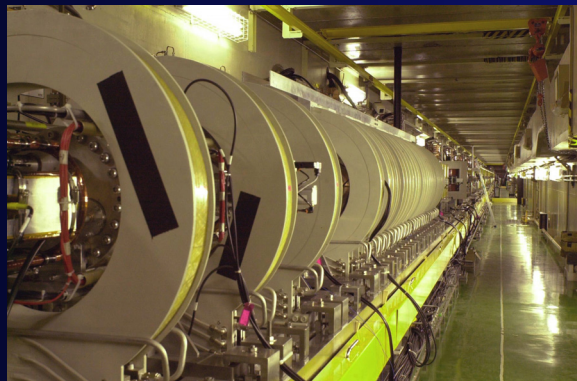
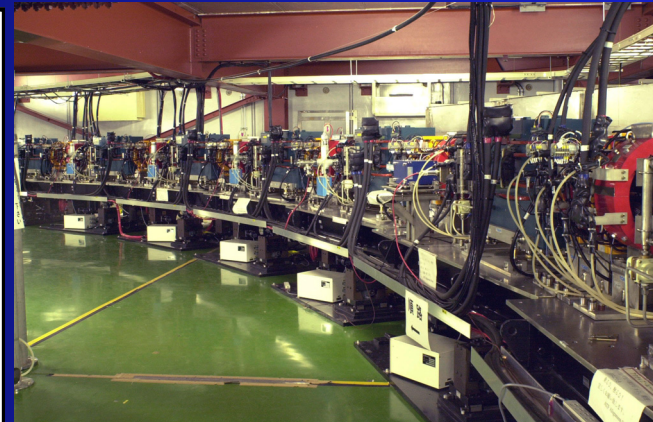
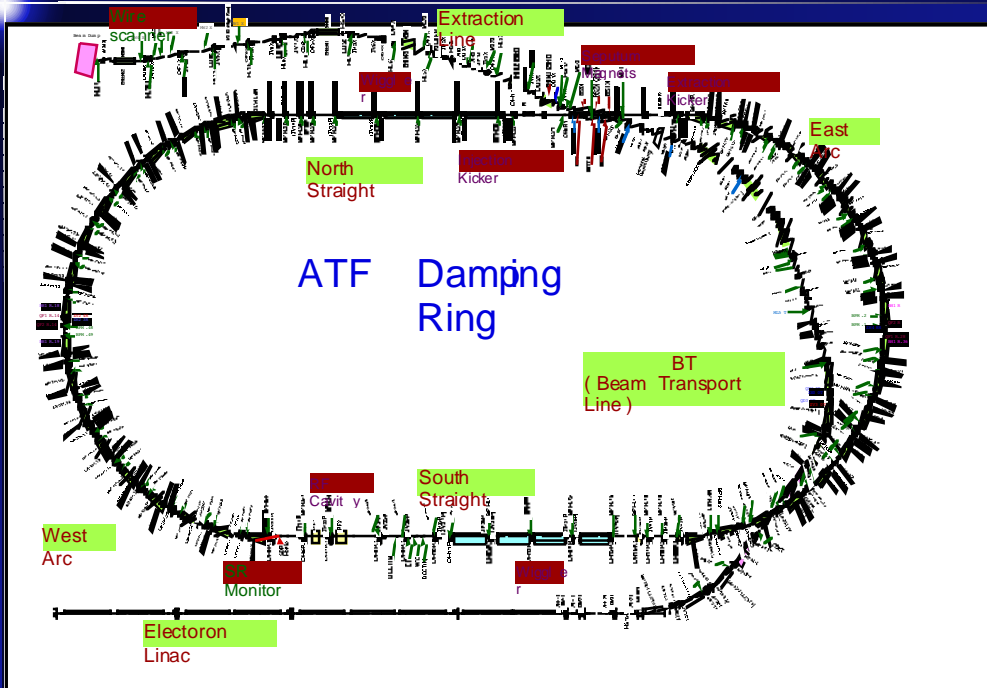
ATF Linac beam stability

DR orbit stability

Extracted beam stability

Source of instability

ATF Introduction



$$E=1.28\text{GeV}$$

$$N_e=1 \times 10^{10} \text{ e-}/\text{bunch}$$

$$\text{Rep}=1.5\text{Hz}$$

$$X \text{ emit}=2.5\text{E-}6$$

$$Y \text{ emit}=2.5\text{E-}8$$

Linac beam stability



- *Single shot BPMs*
- *Synchronous data acquisition system*
- *RF gun test for more stable injection*

DR beam stability



- *Single shot BPMs*
- *Turn-by-turn BPM*
- *SR monitor*
- *Laser wire scanner*

Extracted beam stability



- *Double kicker extraction*
- *Tungsten wire scanner*
- *Cavity BPM*

Beam Stability



- **Linac & BT**

	<i>therm+SHB</i>	<i>RF gun</i>
<i>orbit (rms)</i>	Y <i>31~160μm</i>	Y <i>18~55μm</i>
<i>energy</i>	<i>0.04~0.12%</i>	<i>0.06~0.08%</i>
<i>energy spread (rms)</i>	<i>0.4%+tail</i>	<i>0.2%</i>
- **DR**

<i>orbit (p.p.)</i>	Y <i>~20μm</i> 50Hz? 300Hz?
<i>longitudinal</i>	<i>~1 degree dipole Osc.</i>
- **Extraction**

<i>orbit (rms)</i>	X <i>5μm</i> , Y <i>2μm</i>
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Source of instability



- **Linac**

Gun & RF bunching system *timing jitter, multi-pact...*
klystron amplitude & phase

- **DR**

Magnet power supply *ripple...*
longitudinal oscillation *ripple on rf...*

- **Extraction**

Instability from DR

Double kicker *small break-down....*



final