SuperKEKB injector upgrade for high charge and low emittance electron beam.

High Energy Accelerator Organization (KEK)

High charge & low emittance RF-Gun:
- A-1 RF-Gun (will install until Sep 2012)
  - Cavity: Higher electric focusing field
  - => Quasi traveling wave
  - Due to mis-alignment: Displacement, Short range wakefield
  - Initial offset scan to compensate transverse wakefield
  - Projected emittance dilution due to transverse wakefield
  - Beam diagnostic station
  - Beam transport
  - Alignment
  - Emittance preservation
  - Beam diagnostics

- C-1 RF-Gun
  - LaB$_6$, Ir$_5$Ce at room temperature => QE : 10$^{-4}$
  - LaB$_6$, Ir$_5$Ce with heater => QE : 10$^{-3}$
  - Laser: Higher power & stable laser
  - => Yb based chirped pulse amplification

- 3-2 RF-Gun (from Sep 2011):
  - PF/PF-AR Injection
  - 5nC test stand for SuperKEKB
  - Present beam state

- Present beam state

- Emittance preservation:
  - Present projected emittance measurement
  - Projected emittance using weak lens
  - Initial offset scan to compensate transverse wakefield

- High charge & low emittance RF-Gun:
  - Laser: Nd doped solid state laser
  - - Nd:YVO$_4$ + SESAM passive modelocker oscillator
  - - Nd:YAG 5-stage amplifier

- Linac beam line:
  - Project emittance using weak lens
  - PF Injection
  - Initial offset scan to compensate transverse wakefield