

# First thoughts about the FCC electron source WP1,Task 1.1

- **People:**

  - Tomas Brezina, technical student at CERN since September**

  - S. Doebert, CERN**

  - J. Y. Raguin, PSI**

  - A. Levichev, D. Nikiforov, ... , BINP; first contacts concerning CDR gun**

- **Scope of the work (proposal):**

  - Study different electron sources up to 200 MeV and compare, define interface for LINAC's at 200 MeV**

    - thermionic gun: reliable proven technology, stable, low maintenance, high emittance**

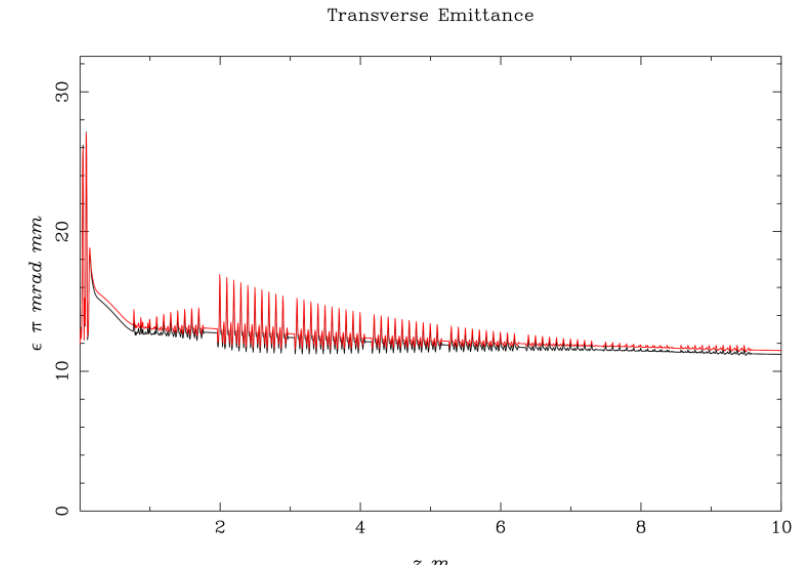
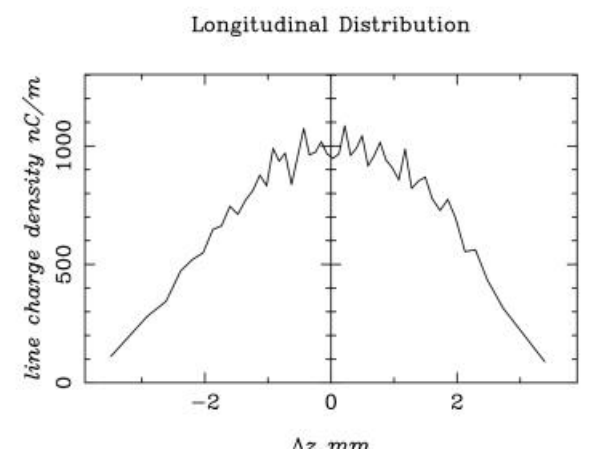
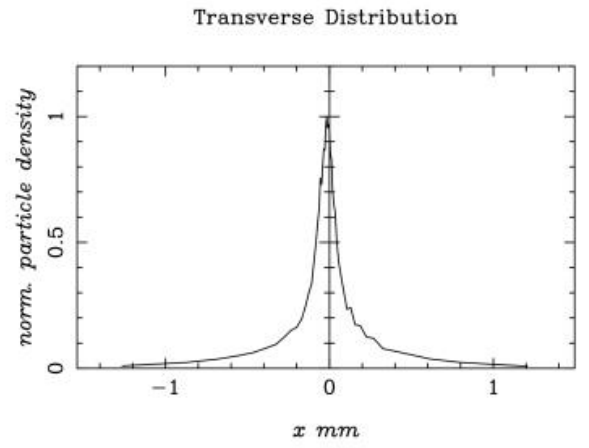
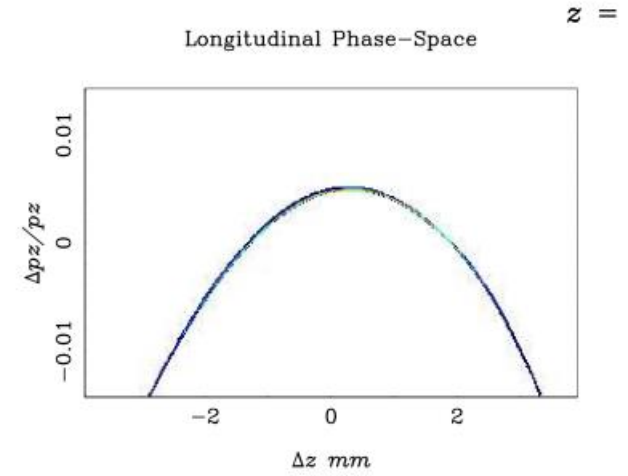
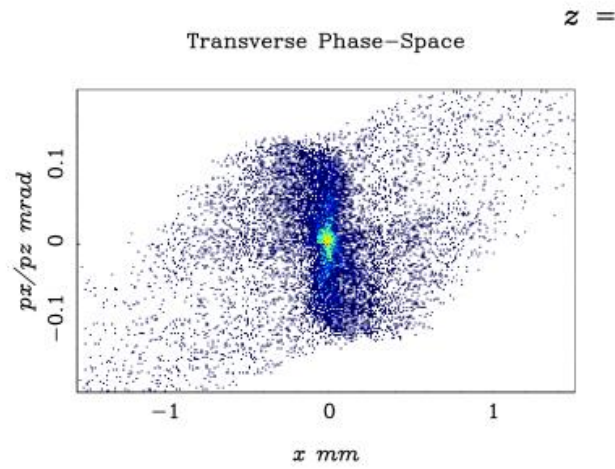
    - RF-gun: good emittance, medium charge stability, very good vacuum needed, cathodes lifetime and exchange, laser operation**

    - BINP rf gun with PM focusing in iris, used in the CDR**

    - One or two guns ?**

# First example from Tomas

## Photo injector (PHIN type)



**4.5 nC**



# First example from Tomas

## Parameters at 200 MeV

parameter	Thermoinjector	Photoinjector
rms Energy Spread [keV]	800	1100
Emittance [ $\pi$ mm.mrad]	53.24	11.35
bunch Length [mm]	1.196	1.561
beam Size [mm]	$\approx 2.5$	$\approx 0.7$

Warning: these are only indicative parameters for discussion

# Input needed and Questions

- **Status BINP agreement ?**
- **Input Parameters:**
  - **Bunch distance, number of bunches, essential for bunching scenario and laser parameters**
  - **Interface with LINAC, what do we optimize for, who deals with our input ?**
- **Accelerating structure design (3 GHz), which one to start with (PSI injector structure ?)**
- **Do we have a laser expert which can be involved to discuss feasibility/constraints of a laser system**
- **Operational constraints, cathode lifetime and exchange, availability**  
**Bunch to bunch charge control ? Anything else ?**