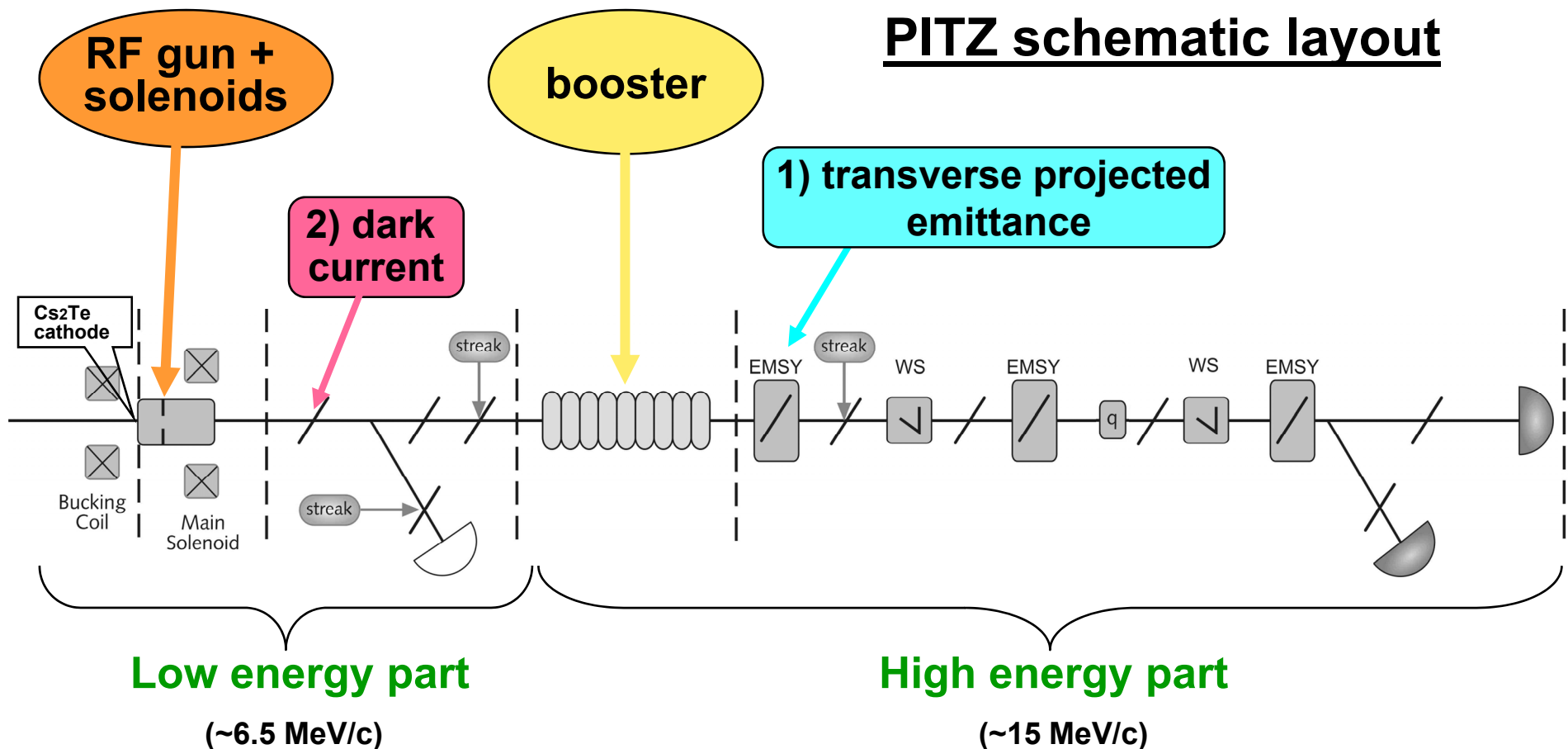
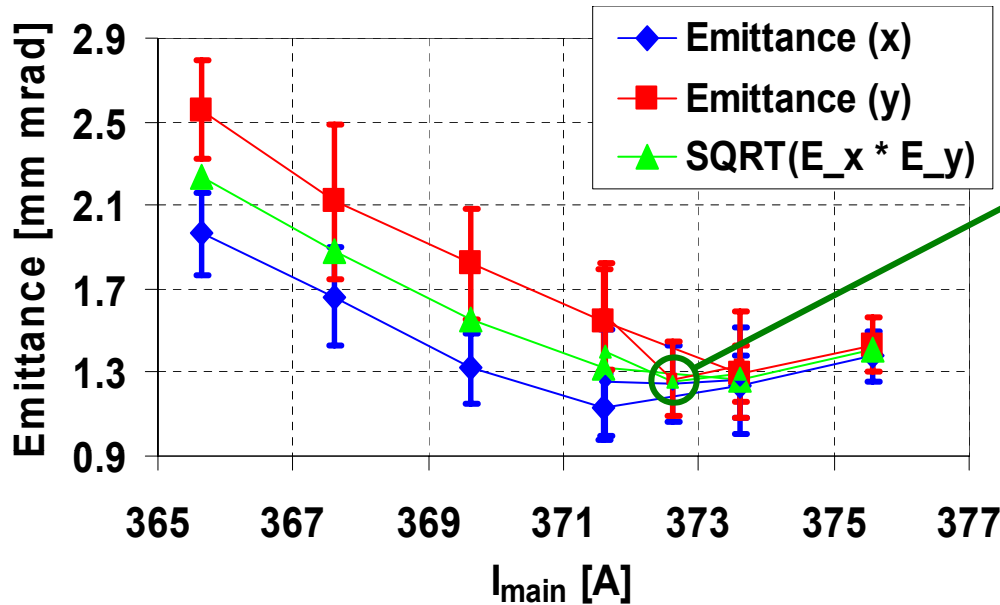


New Experimental results from PITZ

F. Stephan, G. Asova, J. Bähr, C. Boulware, H.J. Grabosch, M. Hänel, L. Hakobyan, Y. Ivanisenko, M. Khojayan, M. Krasilnikov, B. Petrosyan, S. Riemann, S. Rimjaem, T. Scholz, A. Shapovalov, R. Spesytysev, L. Staykov (DESY, Zeuthen); K. Flöttmann, S. Lederer (DESY, Hamburg); D. Richter (BESSY, Berlin); J. Rönsch (Hamburg University); F. Jackson (STFC Daresbury); P. Michelato, L. Monaco, C. Pagani, D. Sertore (INFN Milano – LASA)





→ for ~60 MV/m we obtained

$$\epsilon_{x,n} = 1.25 \pm 0.19 \text{ mm mrad}$$

$$\epsilon_{y,n} = 1.27 \pm 0.18 \text{ mm mrad} \text{ @1nC}$$

for 100 % RMS emittance !

→ in good agreement with prediction from ASTRA

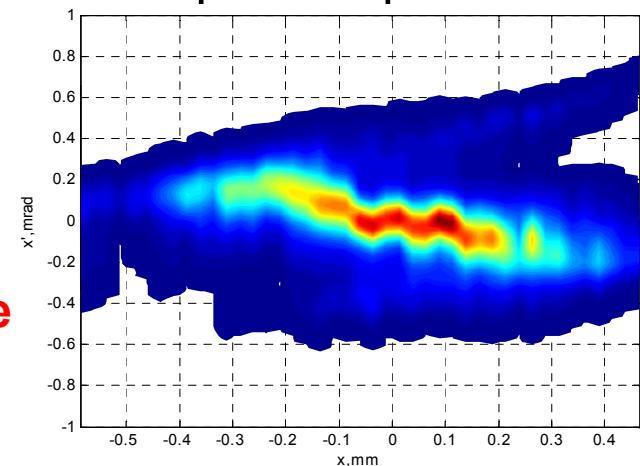
Cathode: # 90.1
Gun gradient: ~60 MV/m
Gun phase: $\phi^{\text{gun}} = \phi_{\text{ref}}^{\text{gun}}$
Momentum from gun: ~6.44 MeV/c

Booster phase: $\phi^{\text{DOOS}} = \phi_{\text{ref}}^{\text{DOOS}}$
Total beam momentum: 14.5 MeV/c

With a 10 % charge cut in the tails of the **phase space distribution** (~ remove non-lasing electrons)

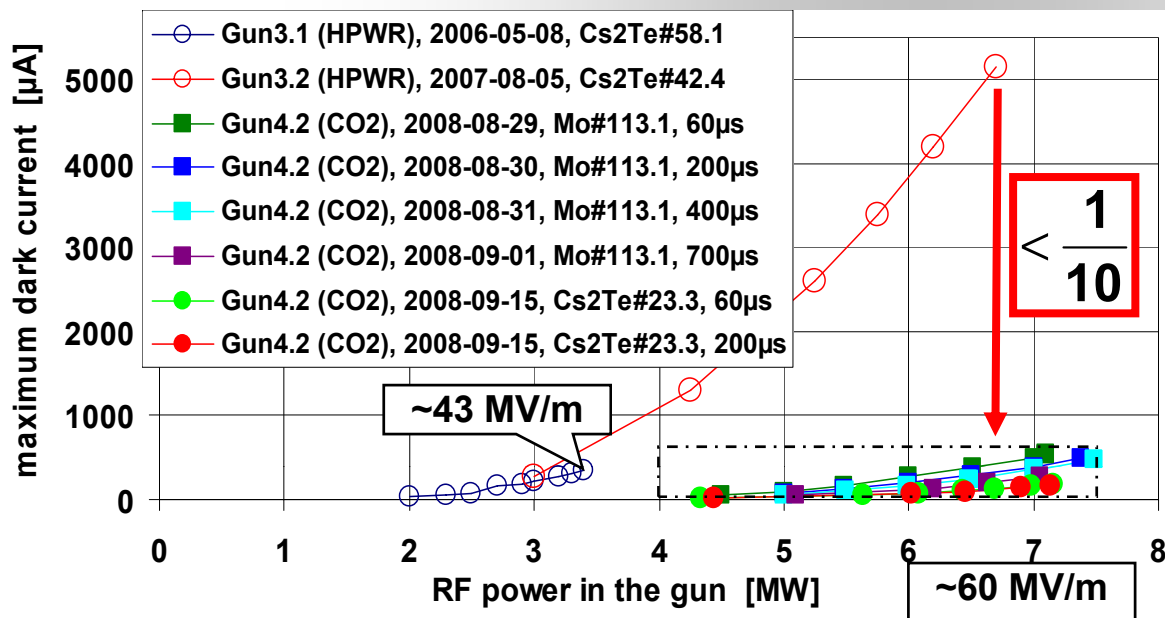
→ normalized projected emittance = **~0.9 mm mrad**

x-x' phase space:



→ **first demonstration of beam quality required for European XFEL**

Dark Current, High Average Power

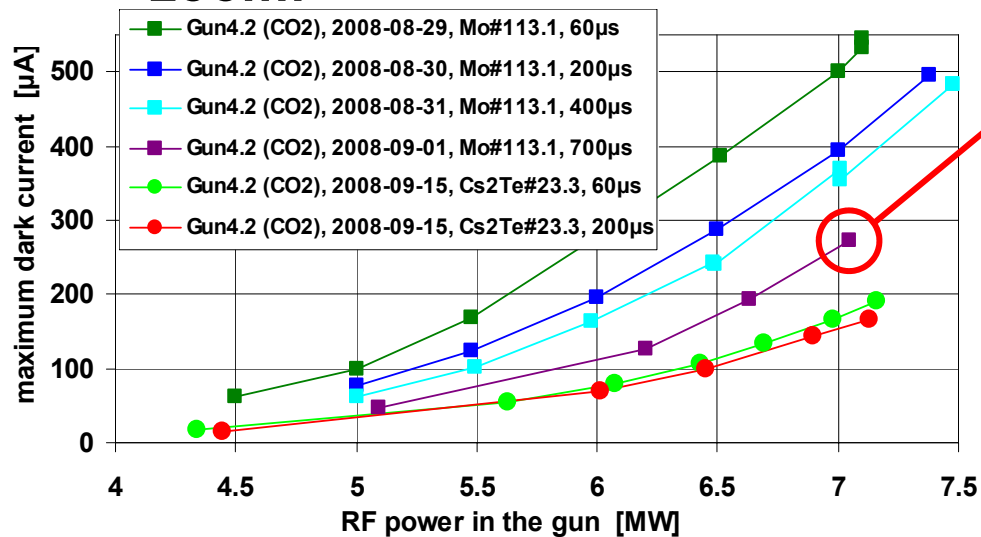


Surface cleaning techniques:

- HPWR: high-pressure water rinsing
- CO2: dry-ice cleaning, for details see **THP013**.

• Major reduction of dark current by CO2 snow cleaning

zoom:



• operation with 50 kW average RF power demonstrated !

→ allows high brightness, high average current operation:
1–5 mA in 700 µs,
7–35 µA long term average

PITZ has open positions for

Postdocs

PhD students

If interested, please get in touch with me !
(frank.stephan@desy.de)