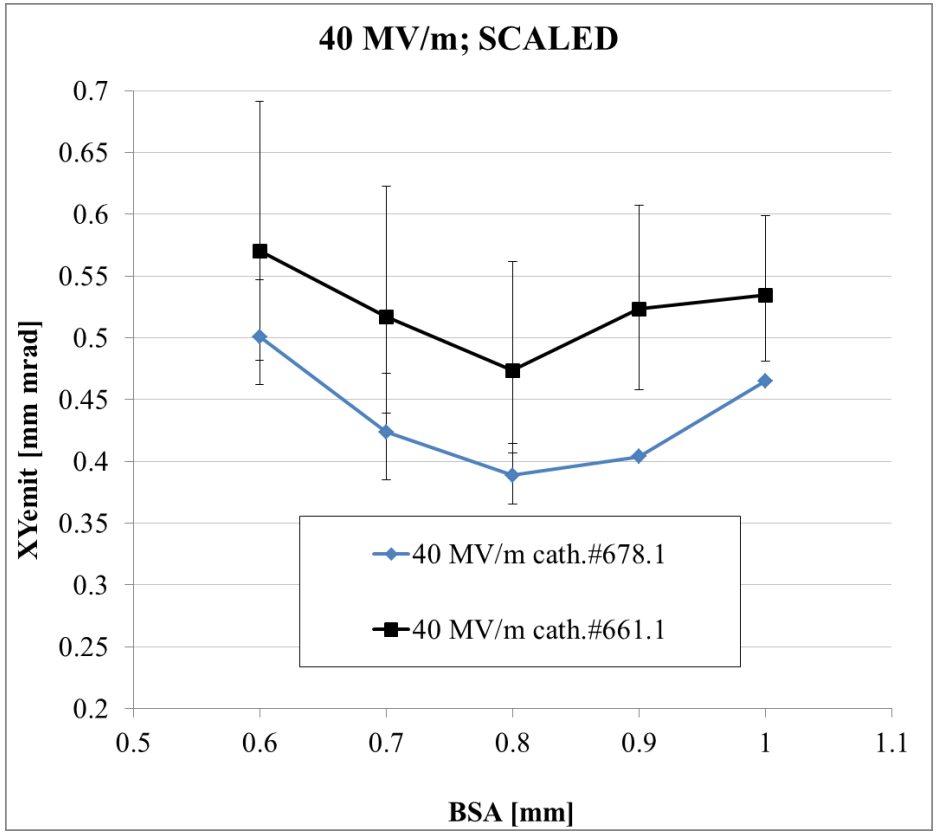
# Emittance for SRF gun gradients at PITZ

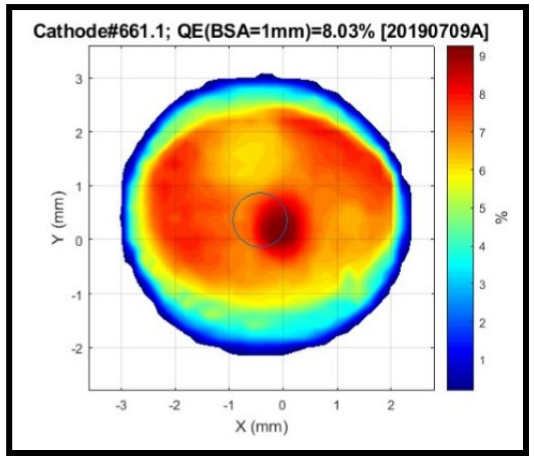
## Analysis of emittance optimization for 30-40MV/m

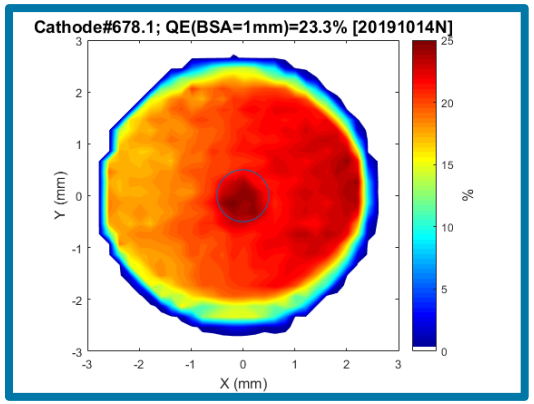
M. Krasilnikov, PPS, 07.11.2019

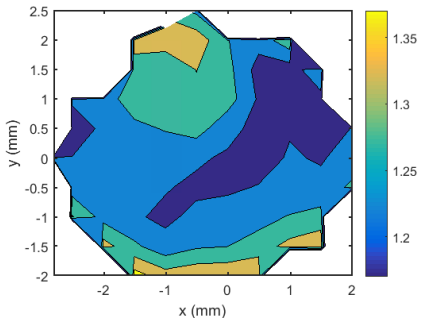
# Emittance 40MV/m

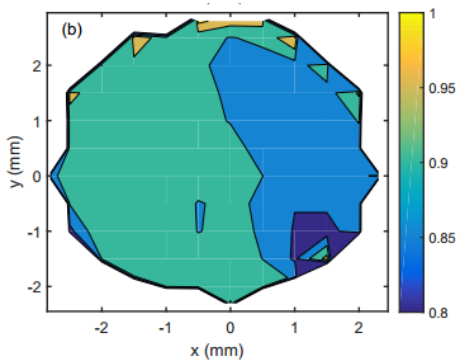
## New (678.1) vs. old (661.1) cathodes

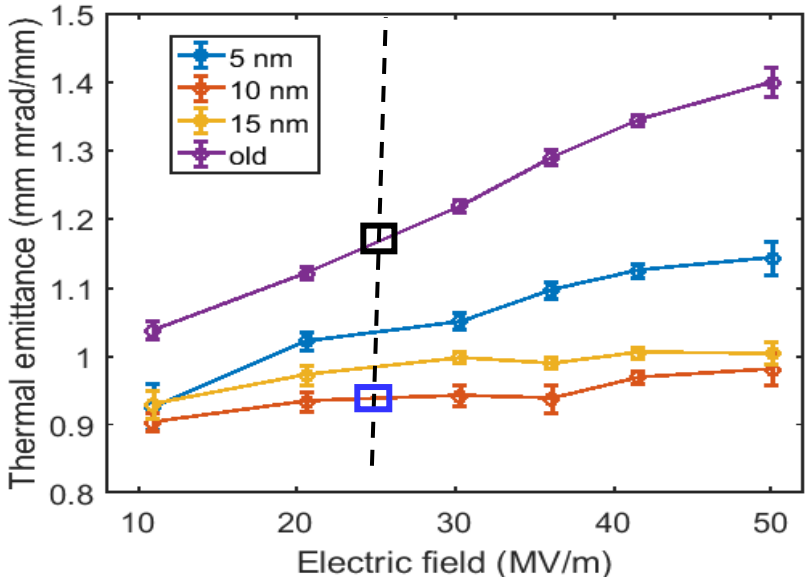


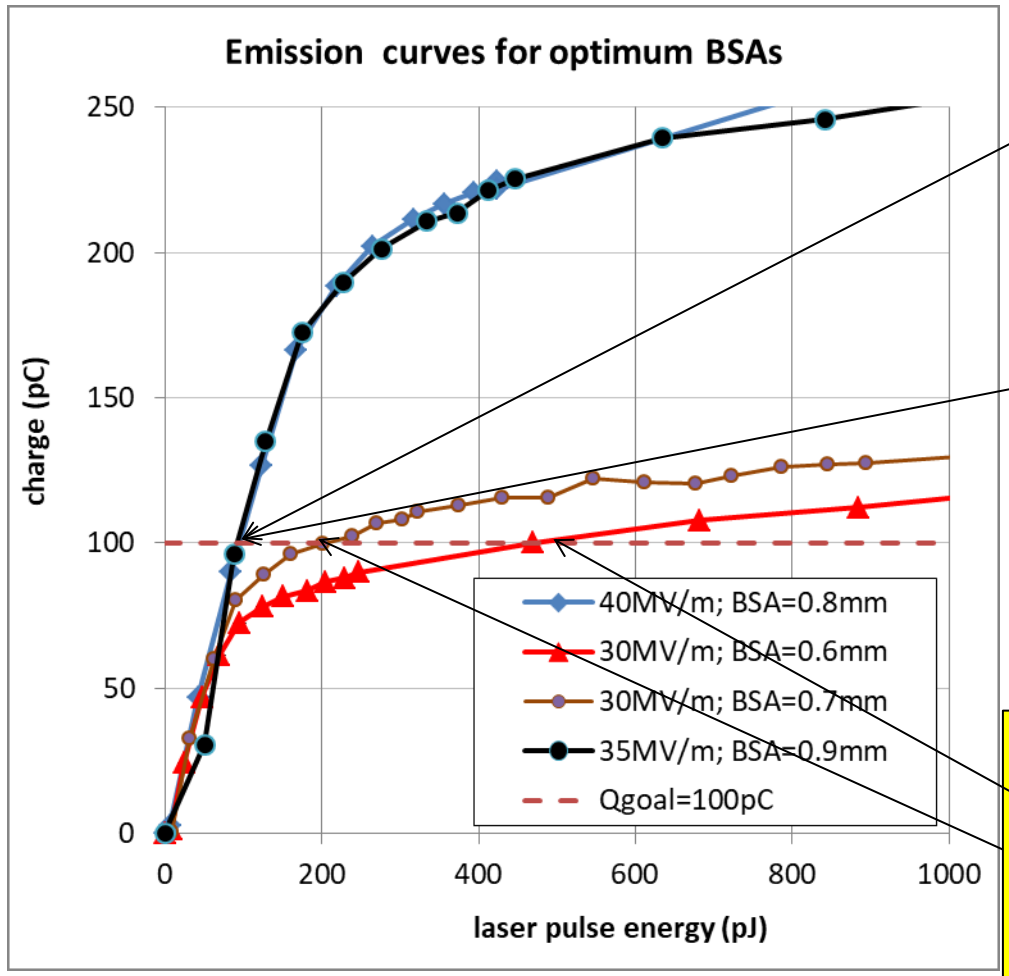




| cath | therm.emit. | 100pC emit | SC+ |
|---|---|---|---|
| 678.1 | 0.18 | 0.39 | 0.34 |
| 661.1 | 0.23 | 0.47 | 0.41 |

# Emittance: 40MV/m; 30MV/m (35MV/m)

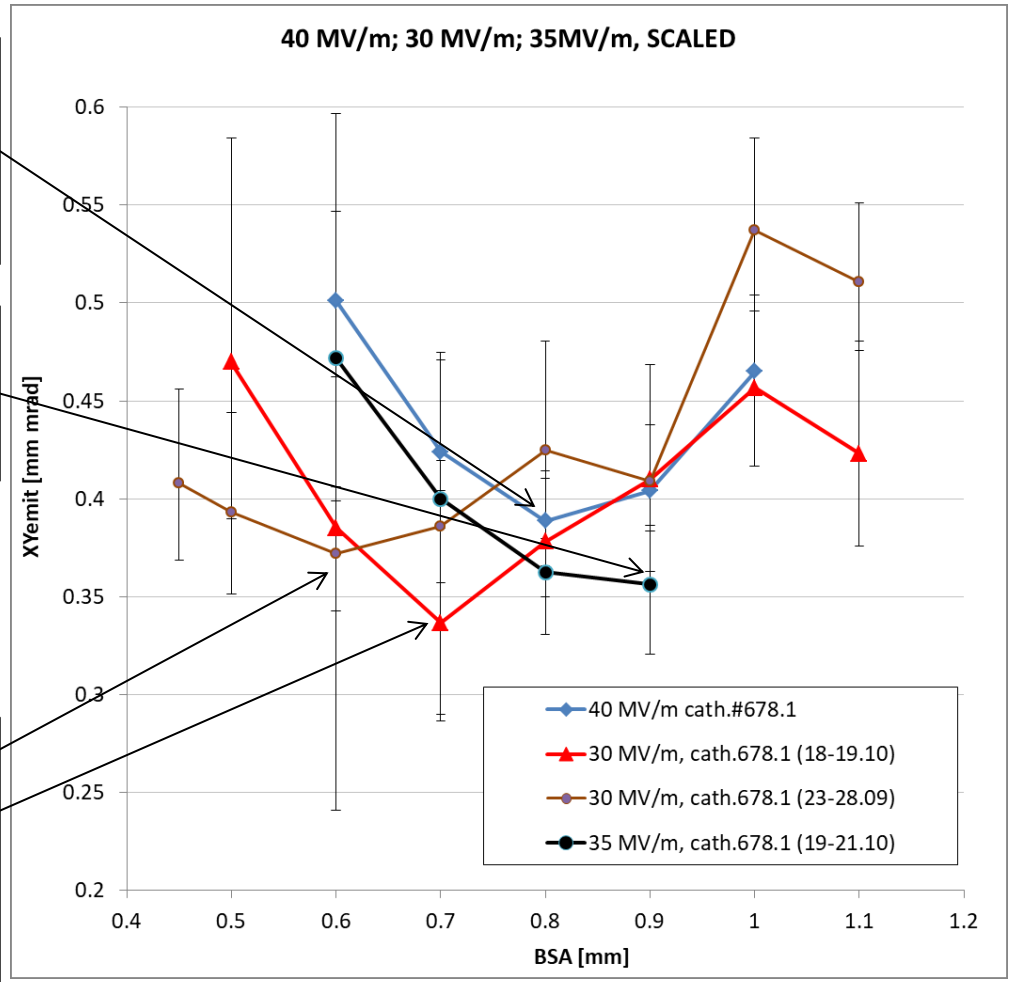
## emission curves Q(Elaser) – charge at LOW.FC1 vs. laser pulse energy




40MV/m, BSA=0.8mm → linear emission

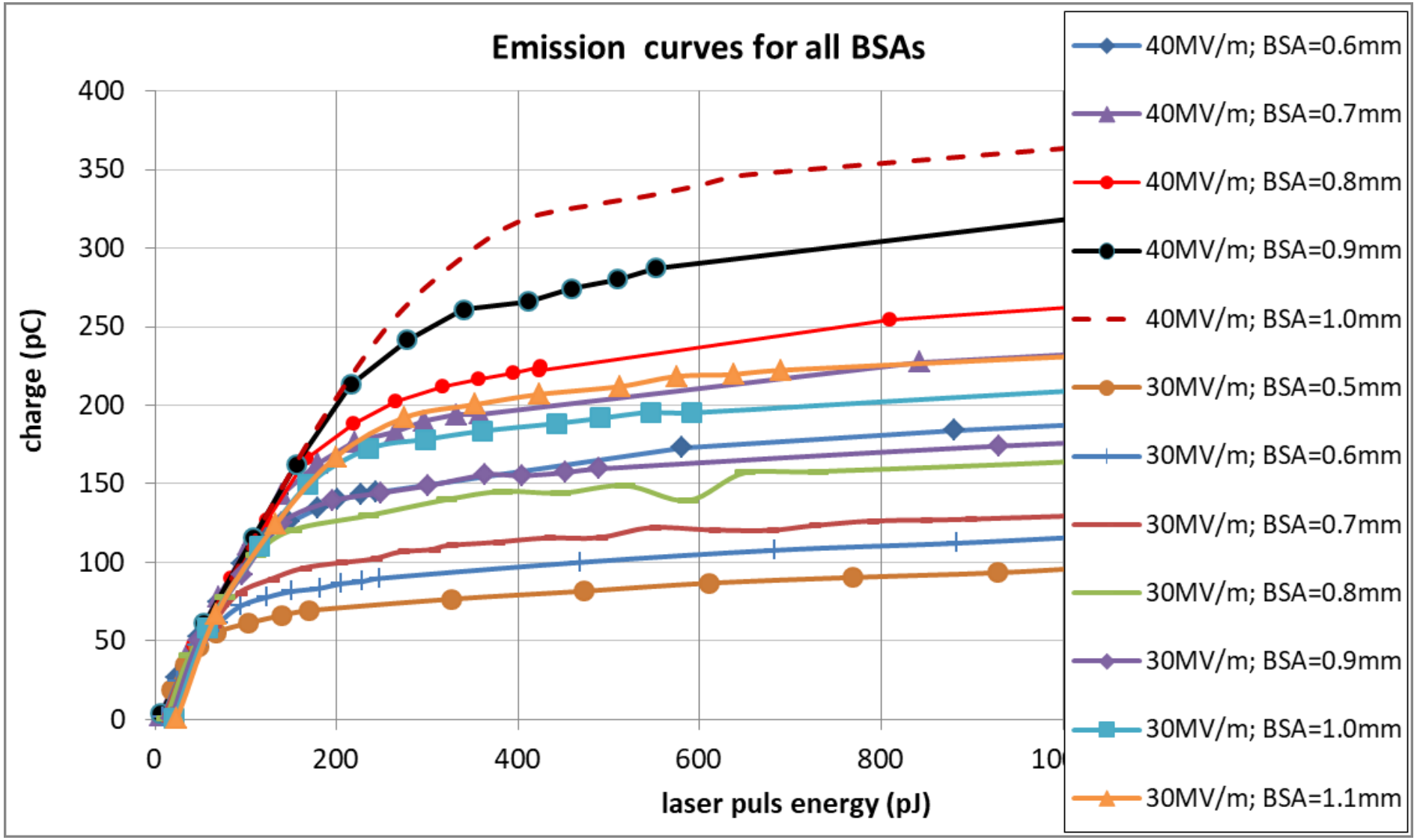
35MV/m, BSA=0.9mm → linear emission

30MV/m, BSA=0.6mm BSA=0.7mm → SC limited emission



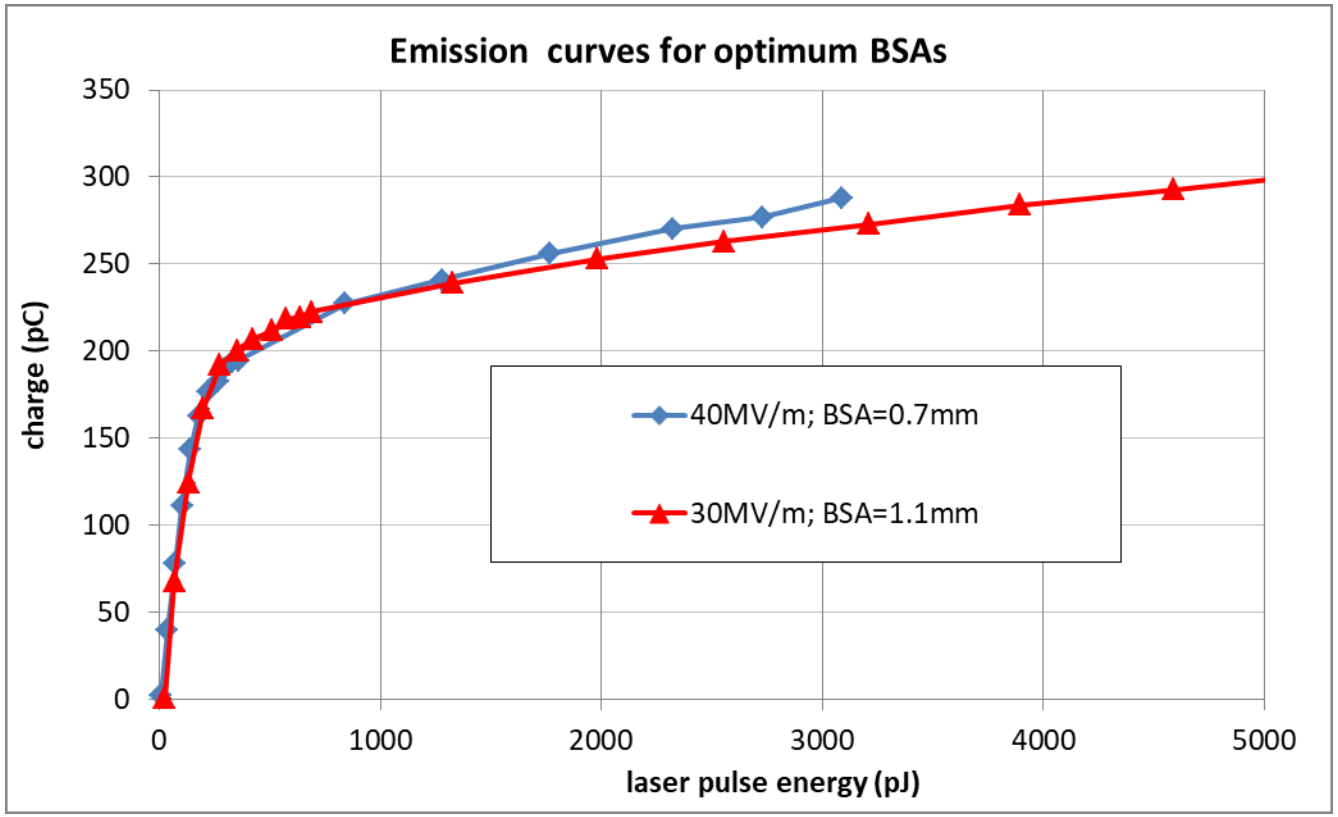
# Emittance: 40MV/m; 30MV/m

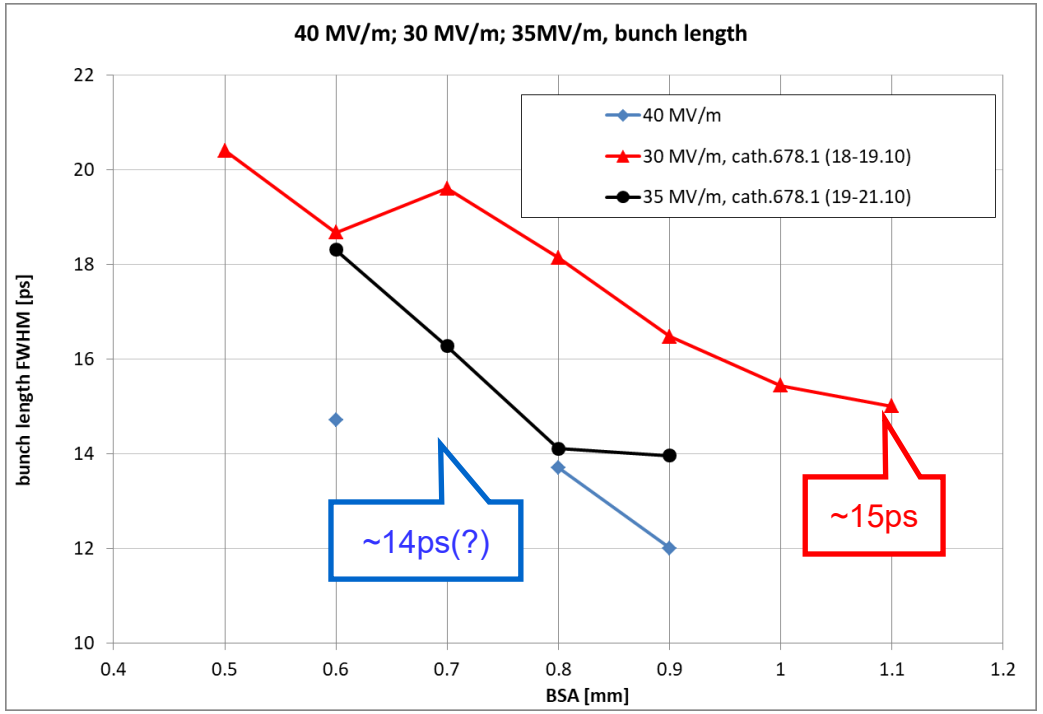
## emission curves Q(Elaser) – charge at LOW.FC1 vs. laser pulse energy



# Emission curves: 40MV/m ~ 30MV/m

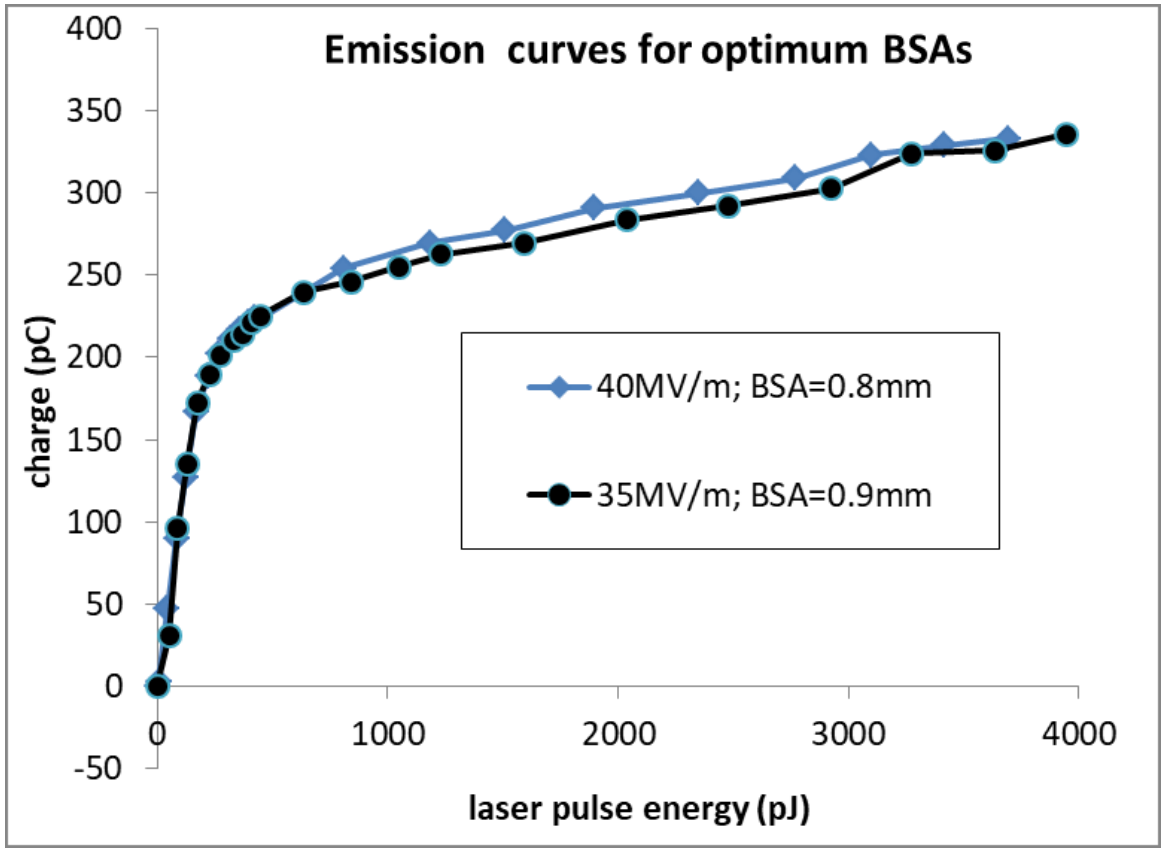
## Similar saturation regime

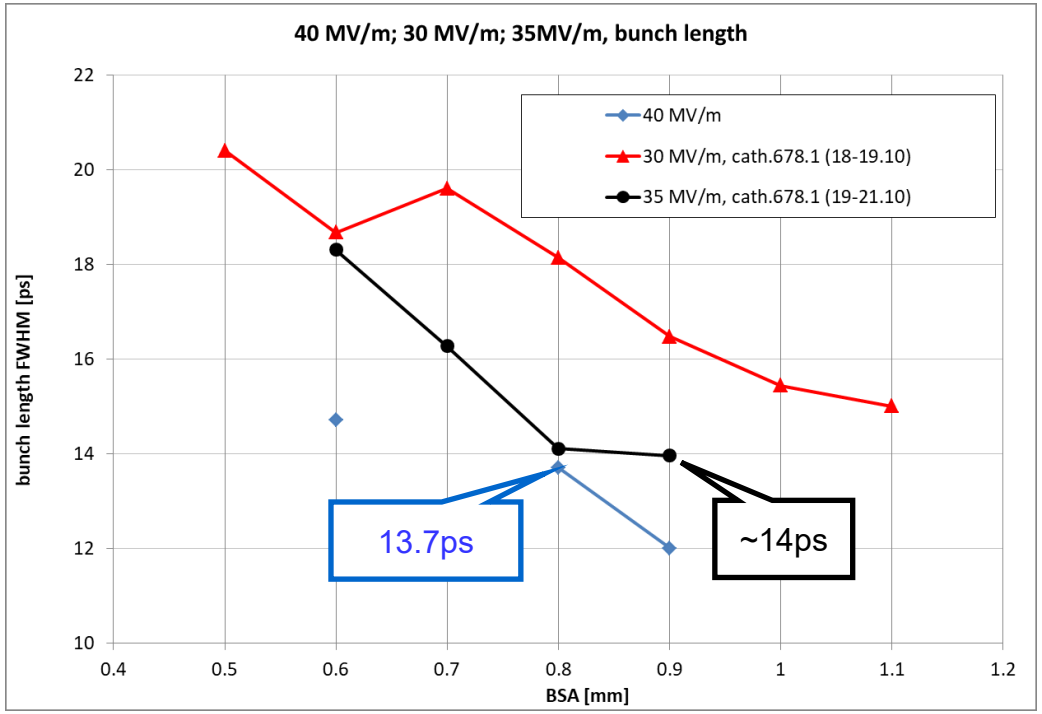


# Emission curves: 40MV/m ~ 35MV/m

## Similar saturation regime



# Outlook: emittance vs gradient

## ?measurements for the next run block?

- Fix the BSA (0.6; 0.5,…)
- Emittance optimization (vs. Imain) for various gun gradients (25?...30..35..40…50…60MV/m?)
- Including emission curves (detailed around 100pC)
- Tune/document trajectory (BPMs and screens)
- …