# The PITZ Plasma Source

## WG1 – Plasma targets, diagnostics and plasma beam transport

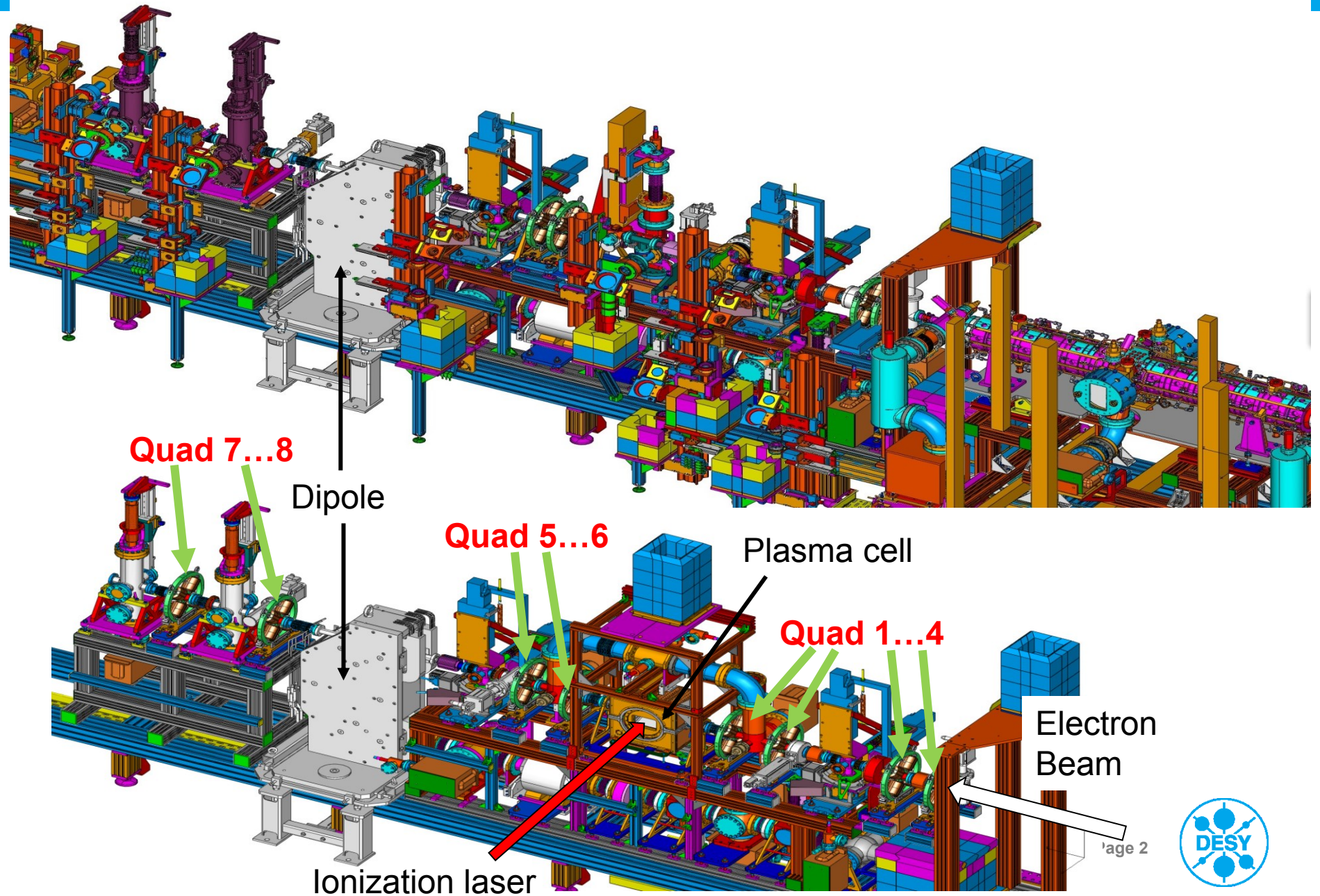
Matthias Gross
LAOLA Workshop
Wismar, 24. June 2015

HELMHOLTZ ASSOCIATION

PITZ Photo Injector Test Facility Zeuthen

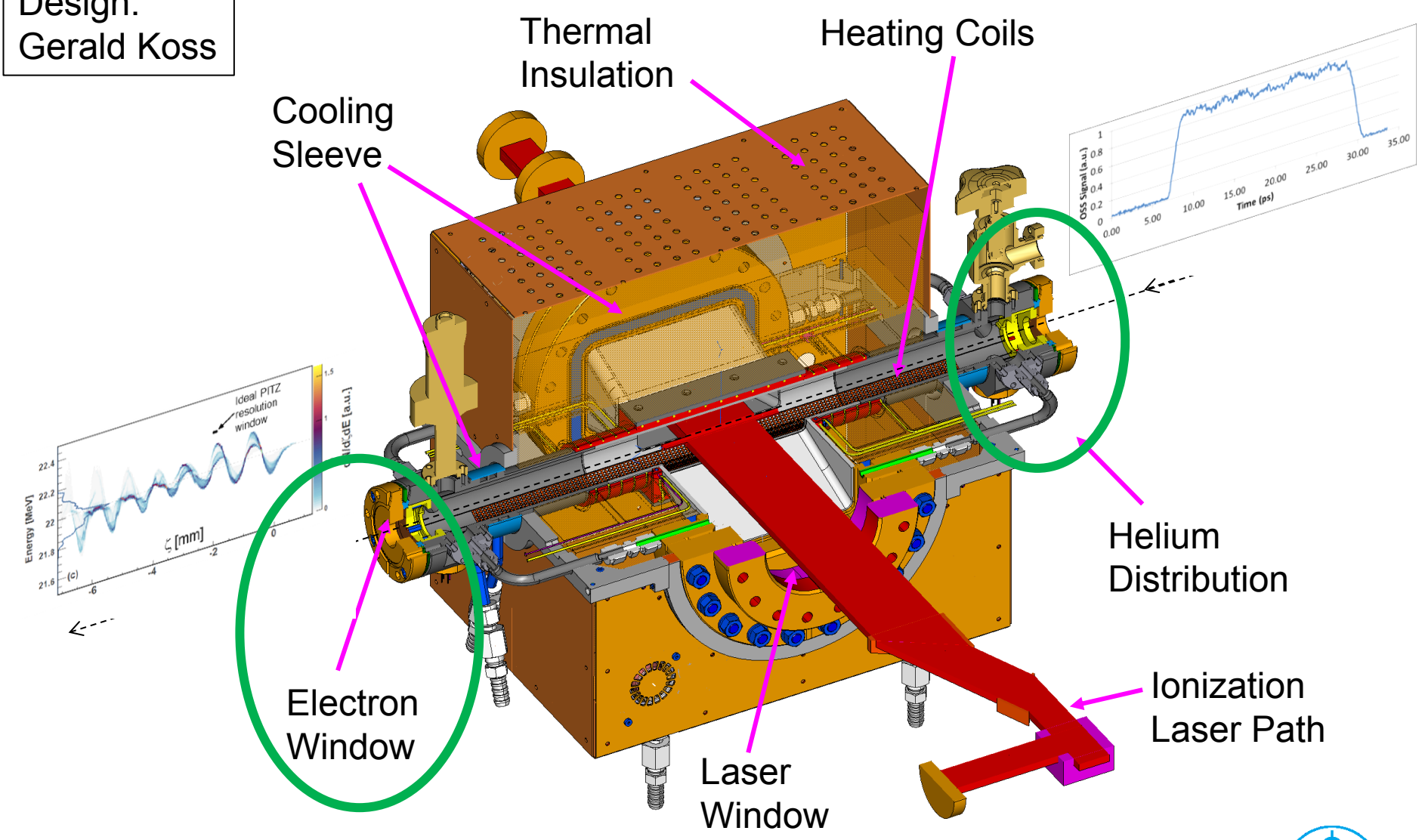
DESY

# Beam Line Remodeling



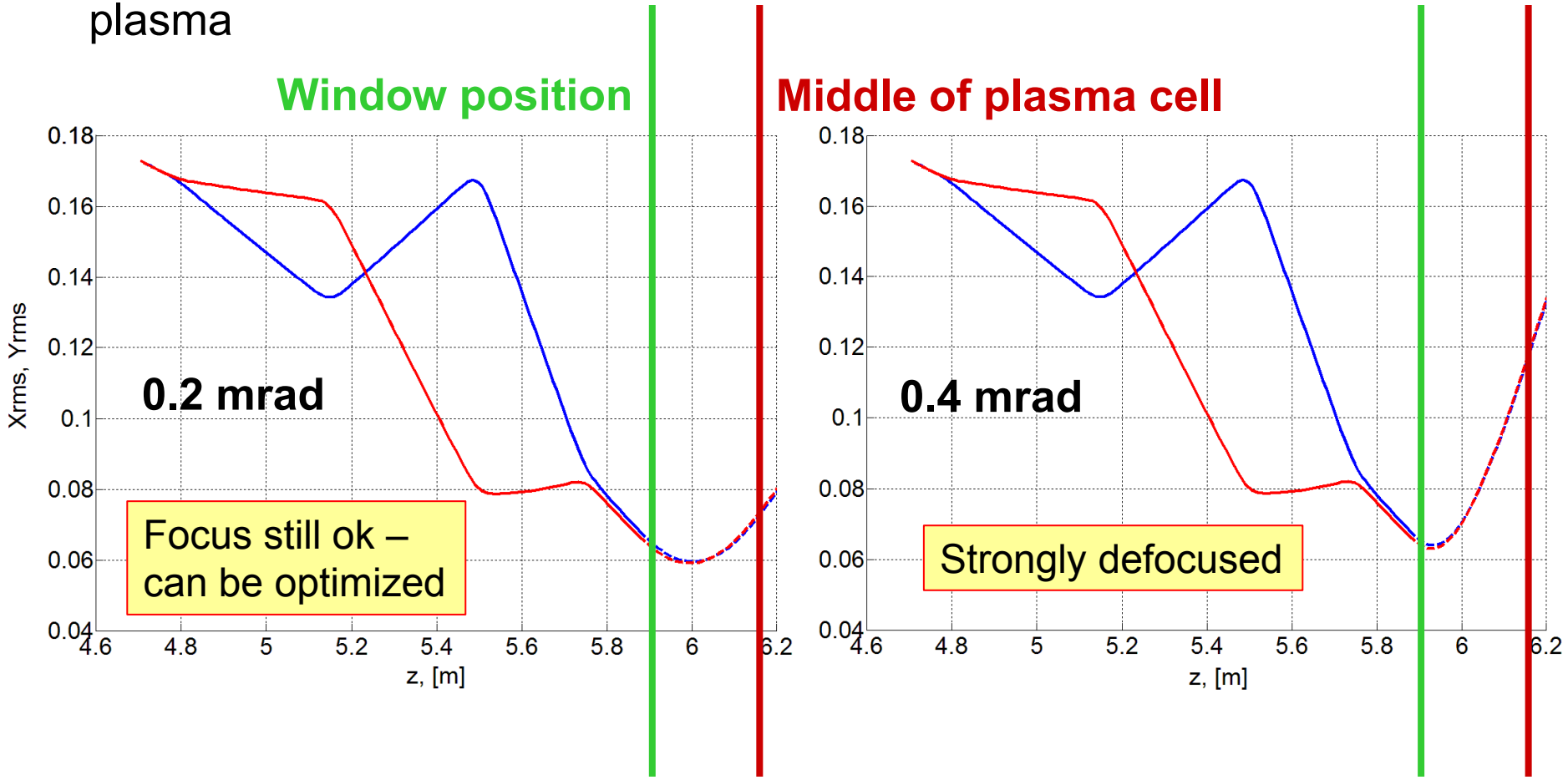
# Plasma Cell Design

Design:
Gerald Koss



# Scattering at Electron Window

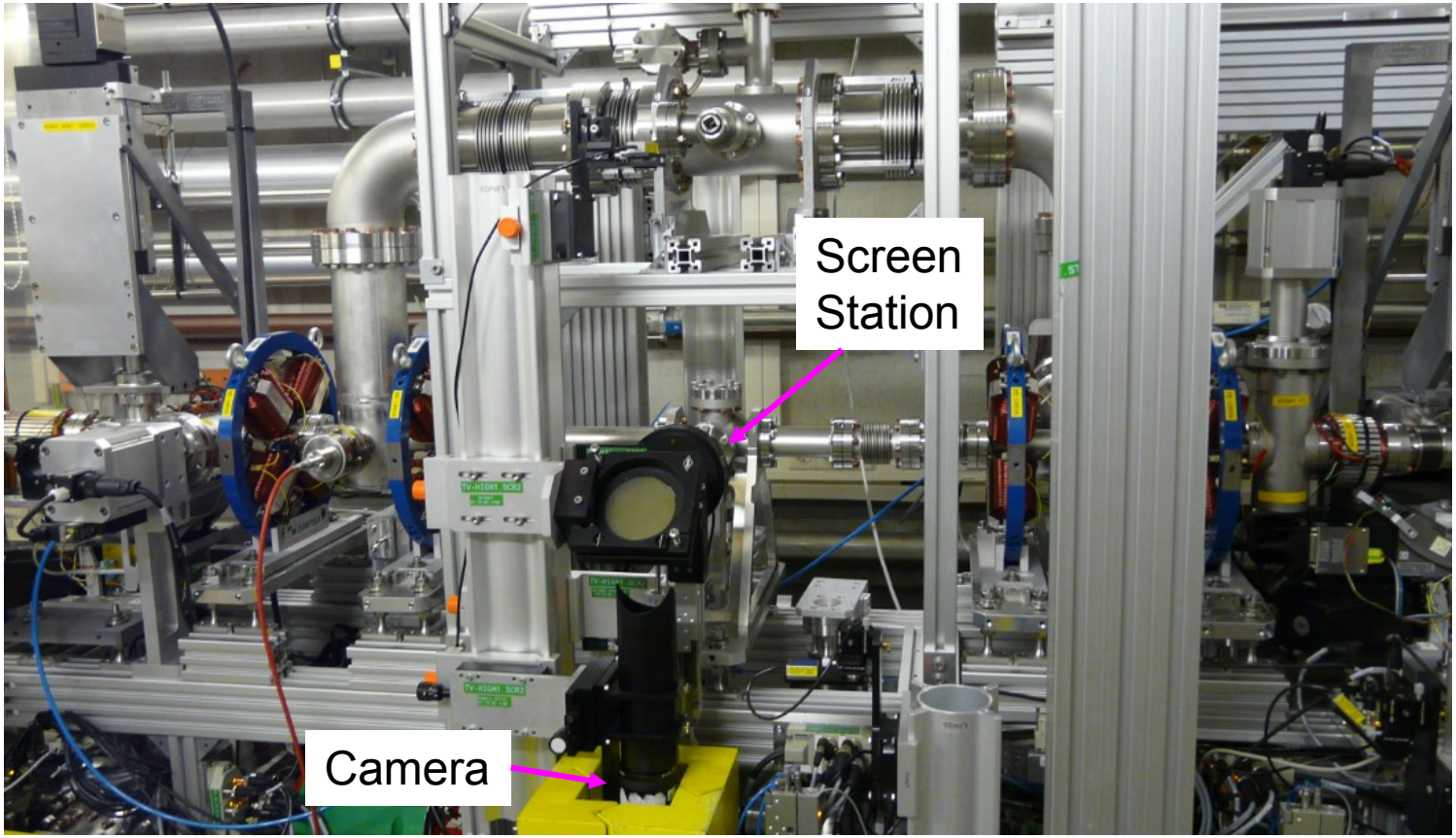
- ASTRA simulations: electron beam scattering impedes focusing into the plasma




- Maximal agreeable scattering angle: 0.2 mrad
- 8μm Kapton foil for first experiments → expect 1 mrad

# Pre-experiment #1: Screen station

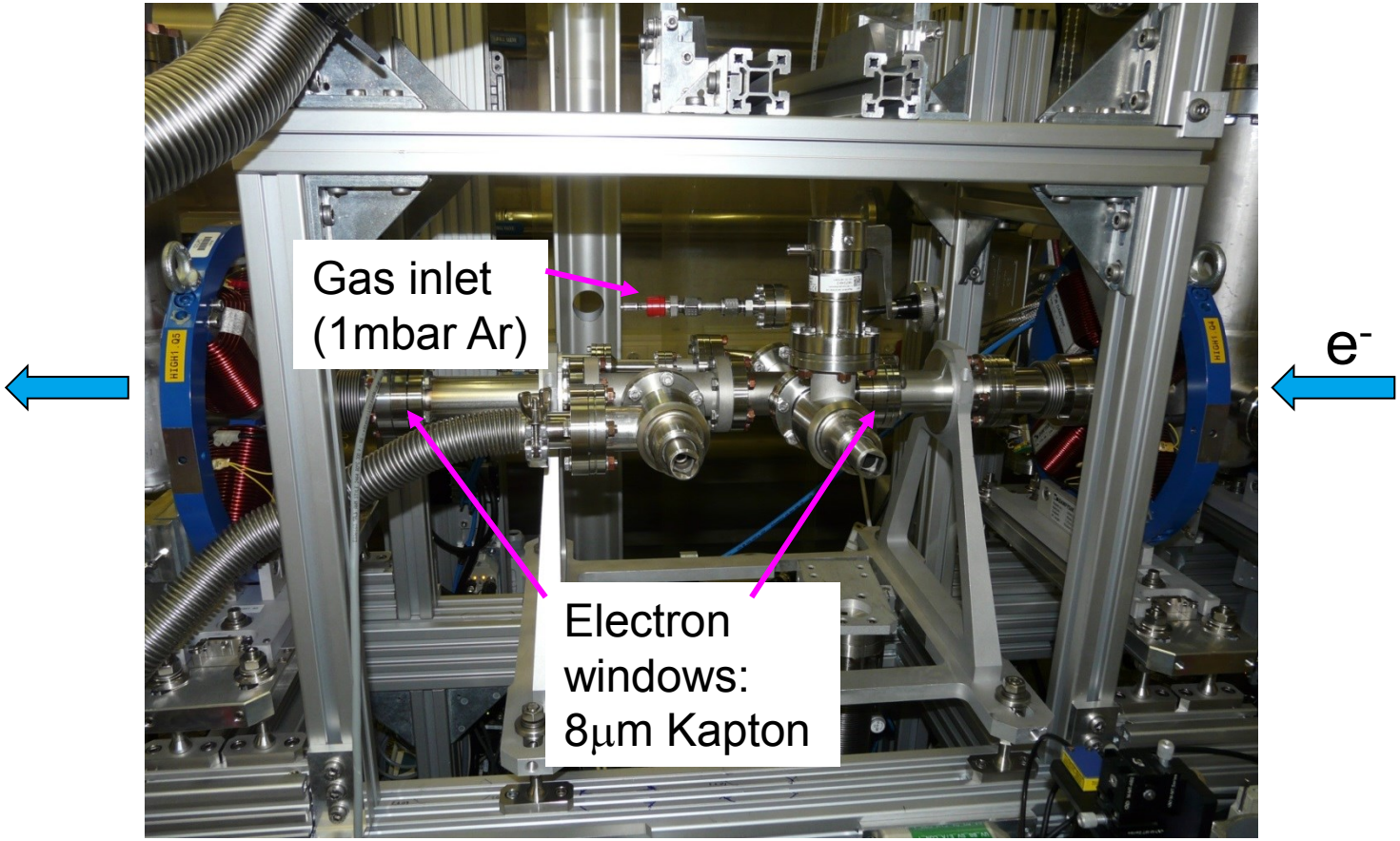
- Purpose: Find quadrupole settings for best focusing




- Best result: <100μm spot size (100 pC bunch charge; 22 MeV; no scattering foil)

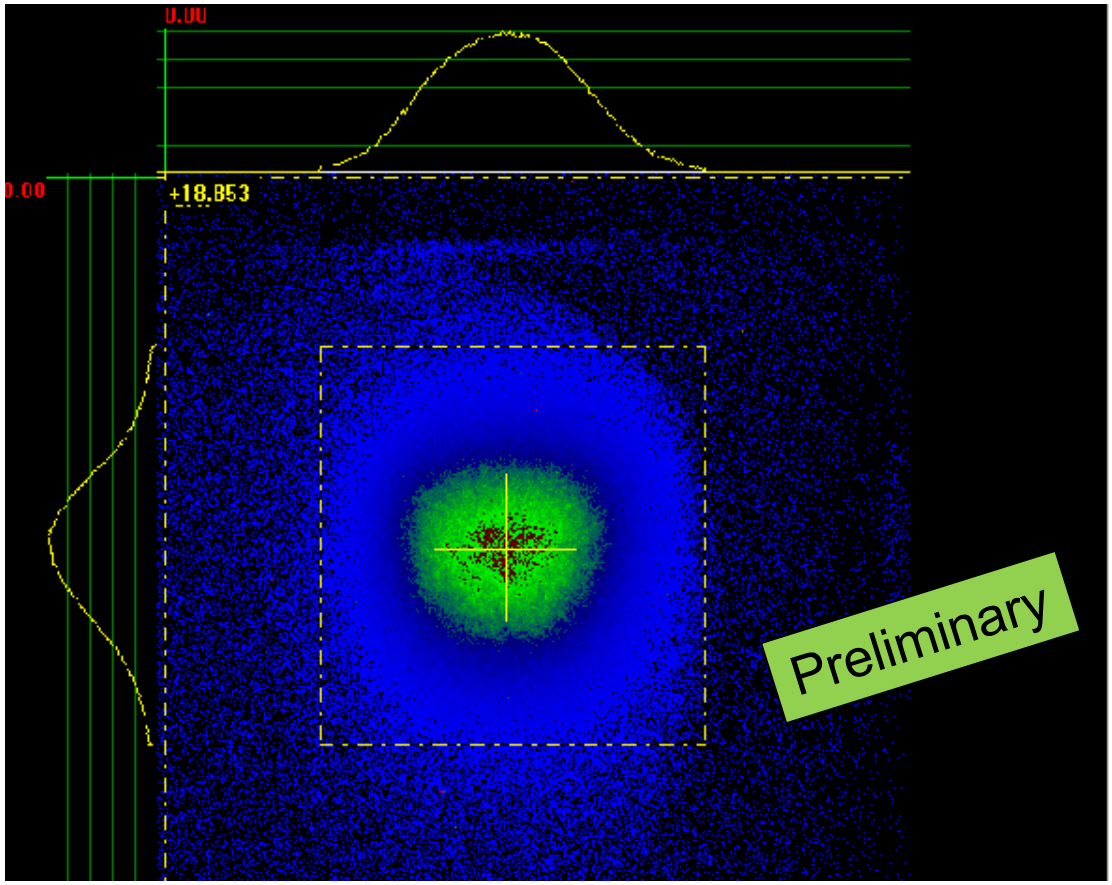
# Pre-experiment #2: Dummy Plasma Cell

- Purpose: test of interaction electron beam ↔ electron window foils



# Pre-experiment #2: Dummy Plasma Cell

- Purpose: test of interaction electron beam ↔ electron window foils




- Capturing of tightly focused beam behind plasma cell (at that time only 2 Quads available for beam capturing)

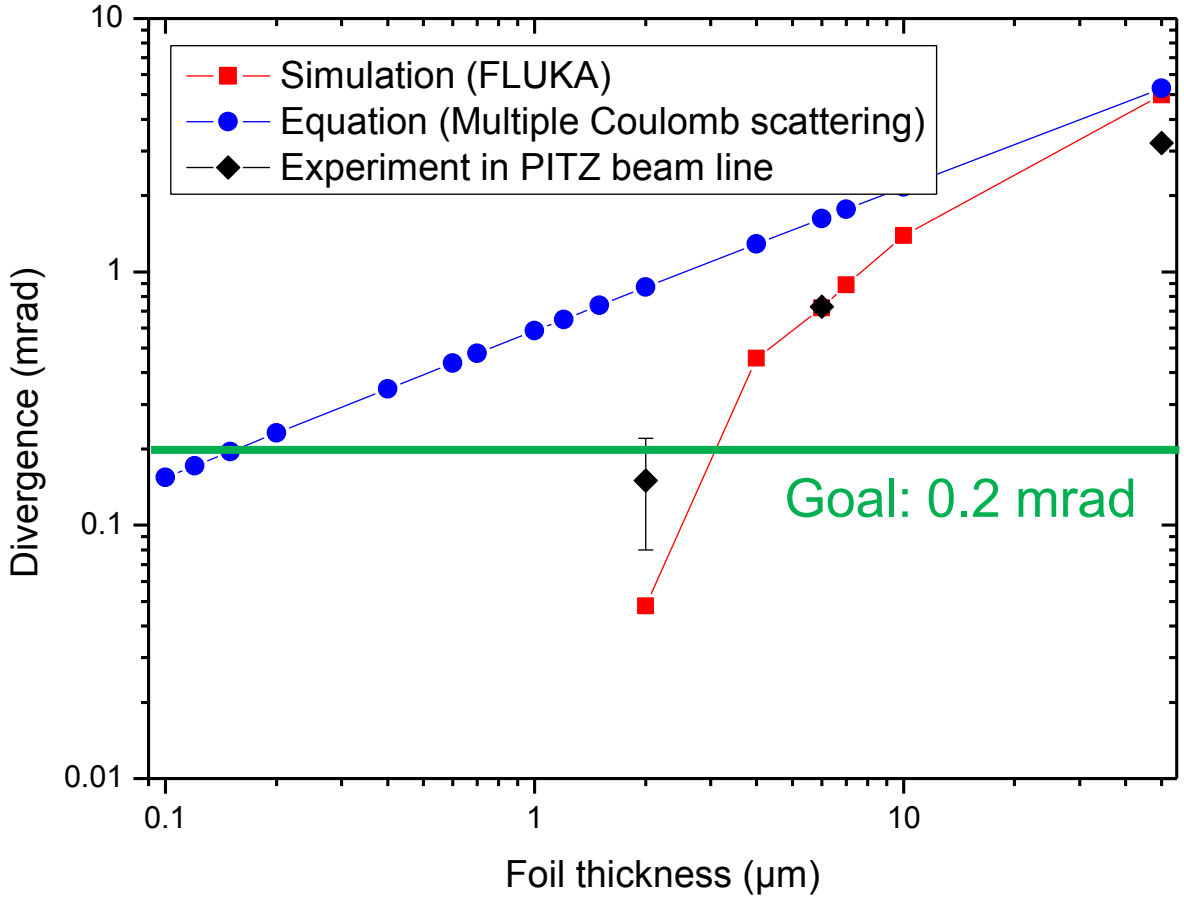
# Summary

- PITZ beamline was remodeled for plasma experiments
- Several preparatory experiments have been performed
  - 1) Beam dynamics: <100μm focusing into plasma cell was achieved
  - 2) Electron beam – plasma cell interaction: 8μm Kapton foil could be used for first experiments
- Simulation shows strong scattering, but beam passed plasma cell intact

# Backup

# Pre-experiment #3: Electron Beam Scattering

- Purpose: Find maximal allowable window foil thickness




- Result: ≈3µm (to be checked: gas diffusion)