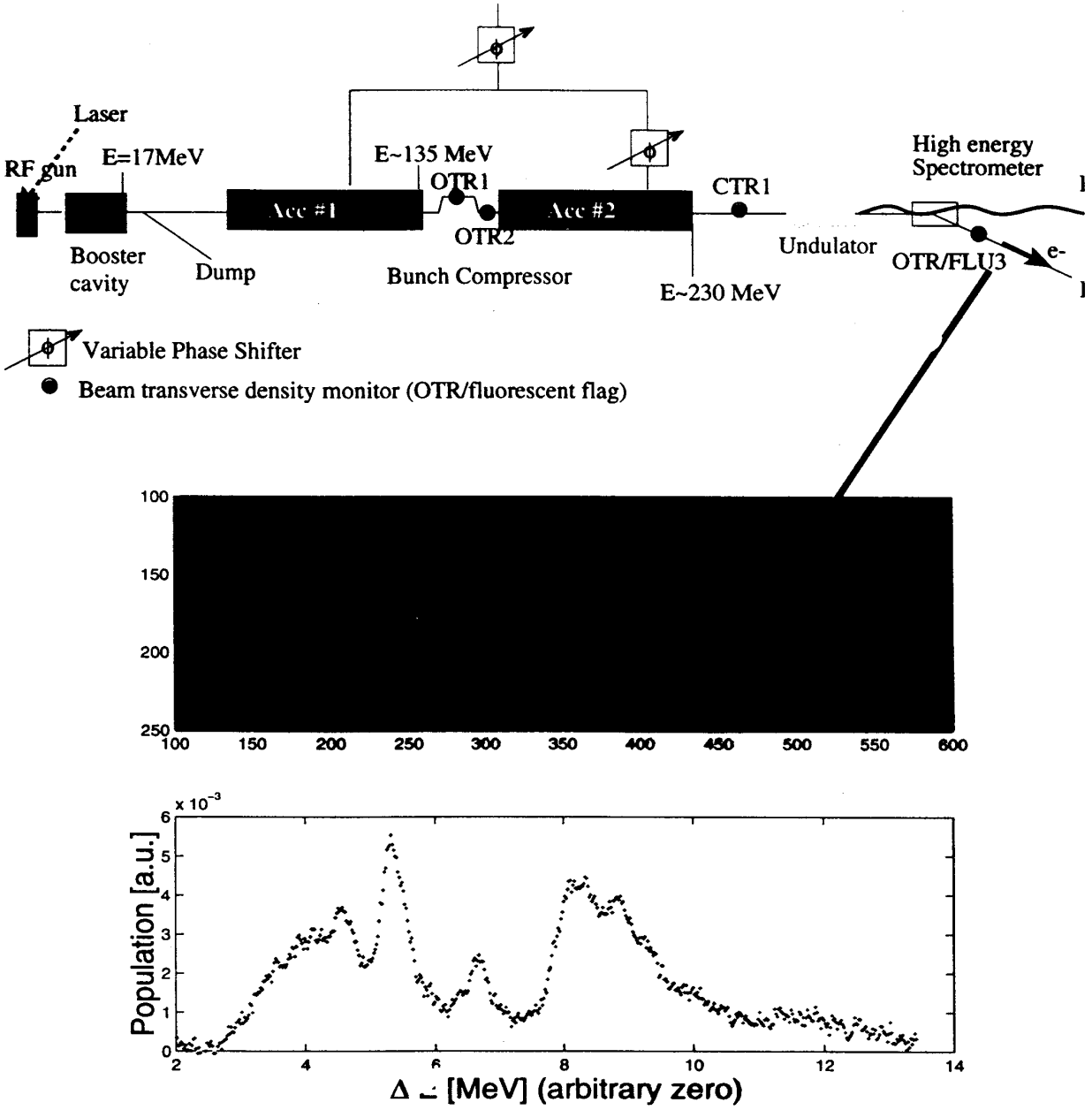
CSR Studies at TTF I

Ph. Piot for TTF-FEL Team

Piot

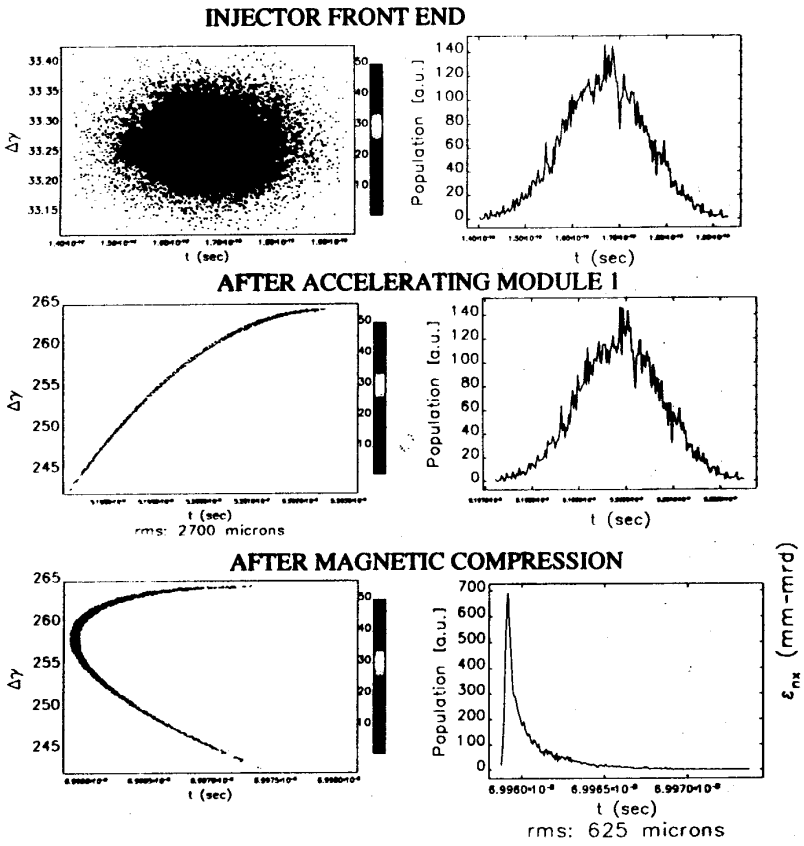
TTF phase I - Compression Issues-

* bunch compression to 500 microns (RMS) with magn. chicane

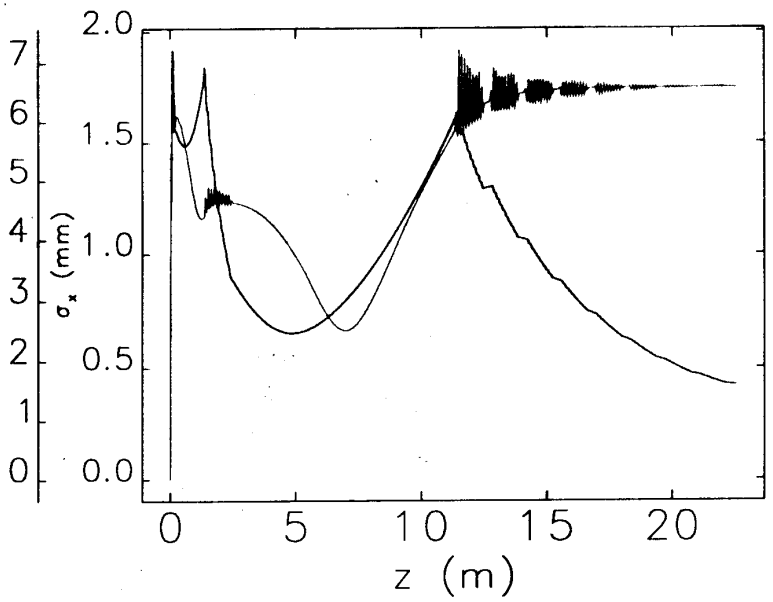


-> anytime the bunch compressor was operated for max. compression we observed a "fragmentation" of the energy profile: wakefield in ACC #1 (NO!), CSR (MAYBE...)

Problem with the present Injector

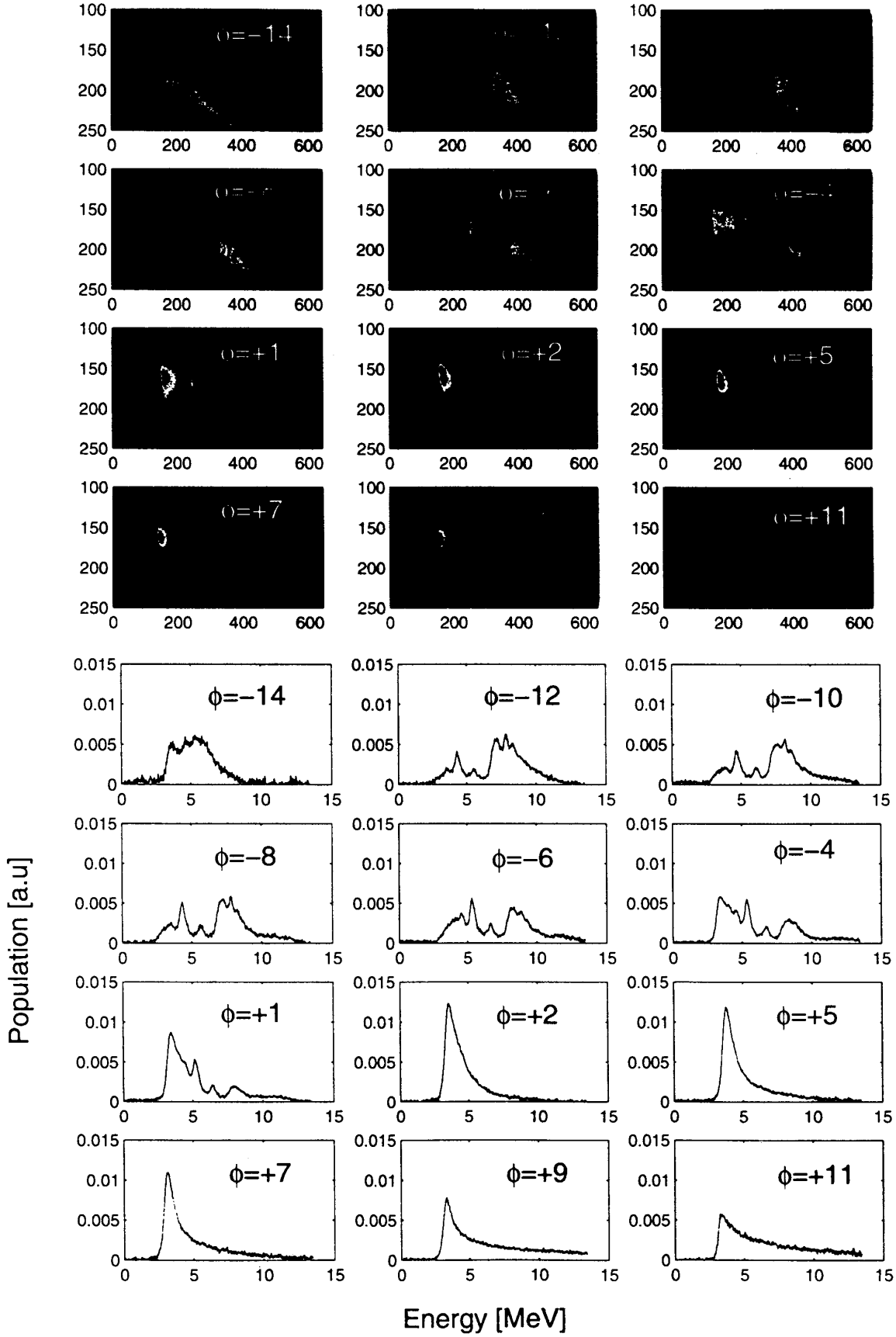


- too long incom. bunch
- too long drift btw capt. cav & module 1



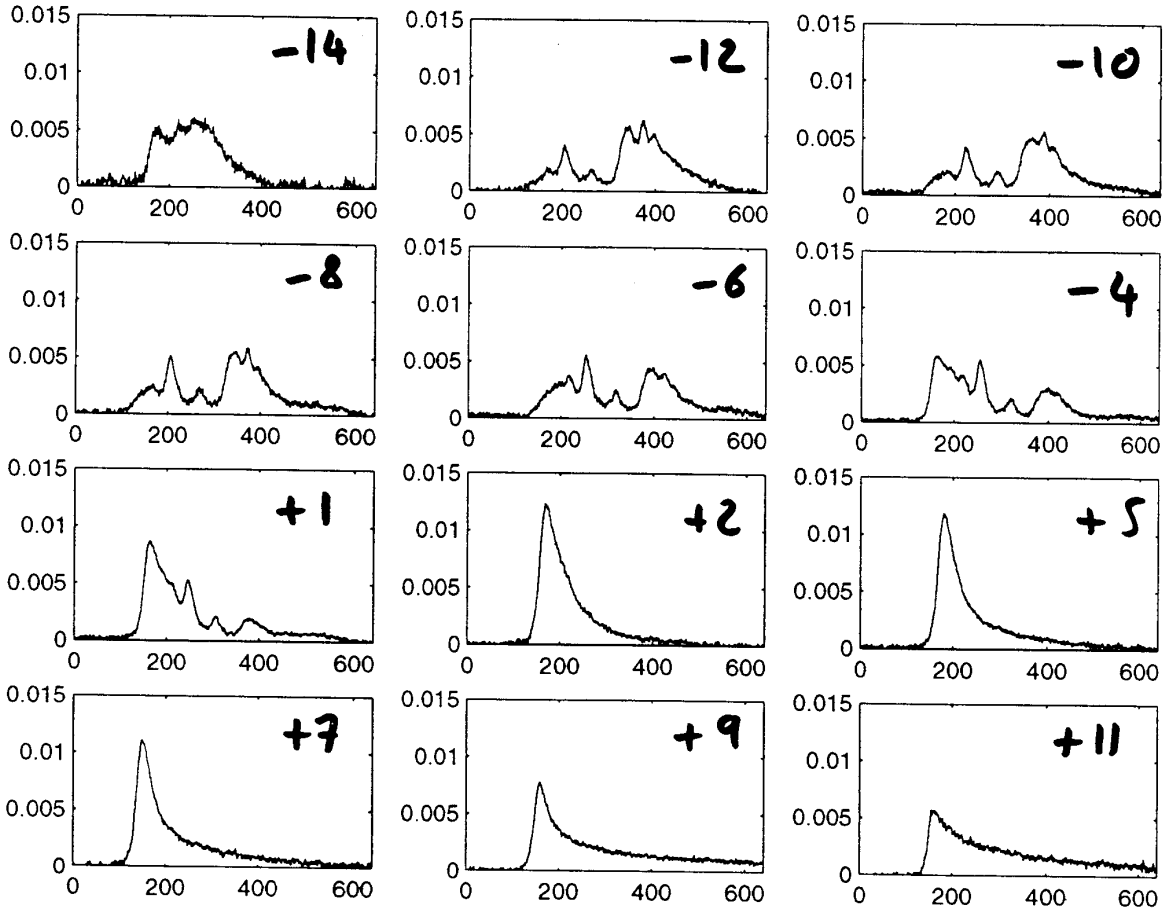
Energy Profile Fragmentation at Tesla Test Facility

Profiles versus phase of ACC #1 (max compression at -8 deg)



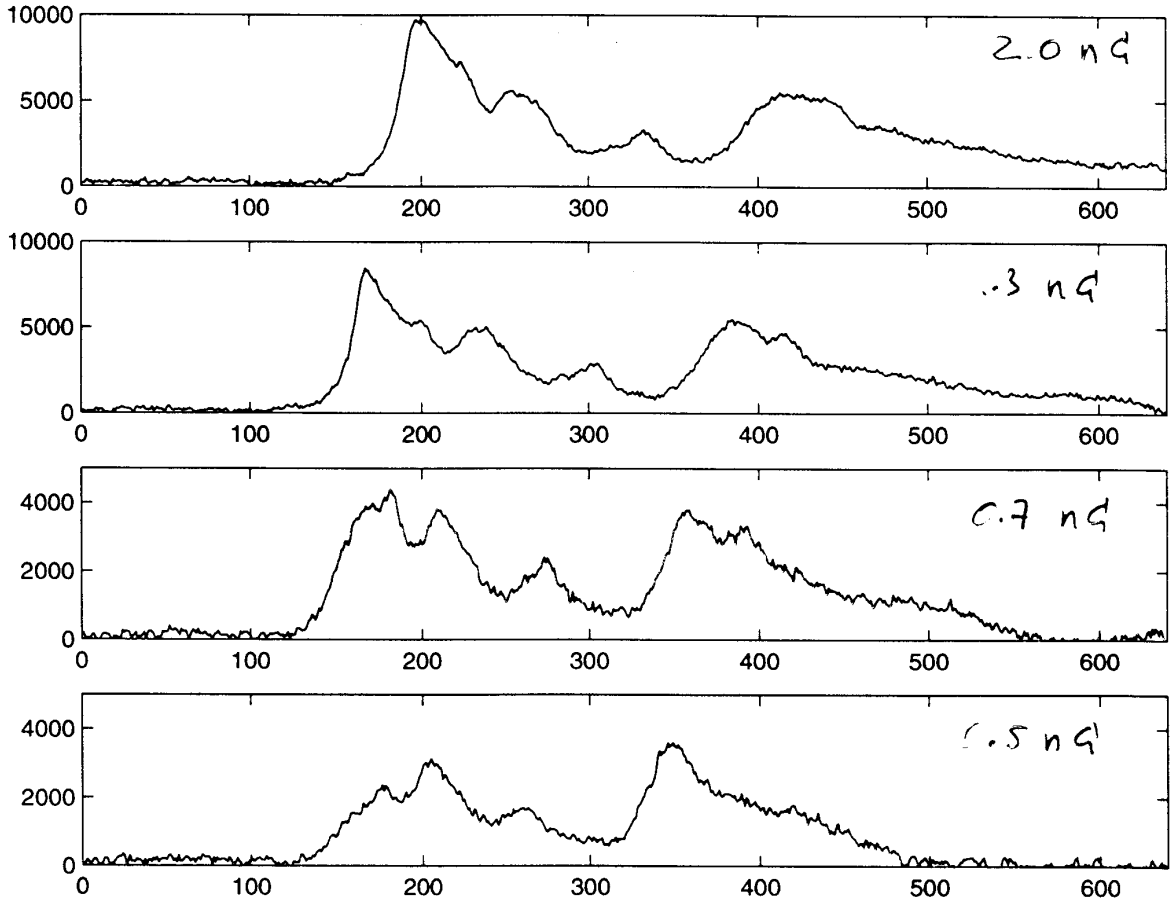
Beam Profile Observed in high energy dispersive Section V.S. ϕ_{Acc1}

- Acc 2 "on crest"
- Single bunch observation
- BC2 ON

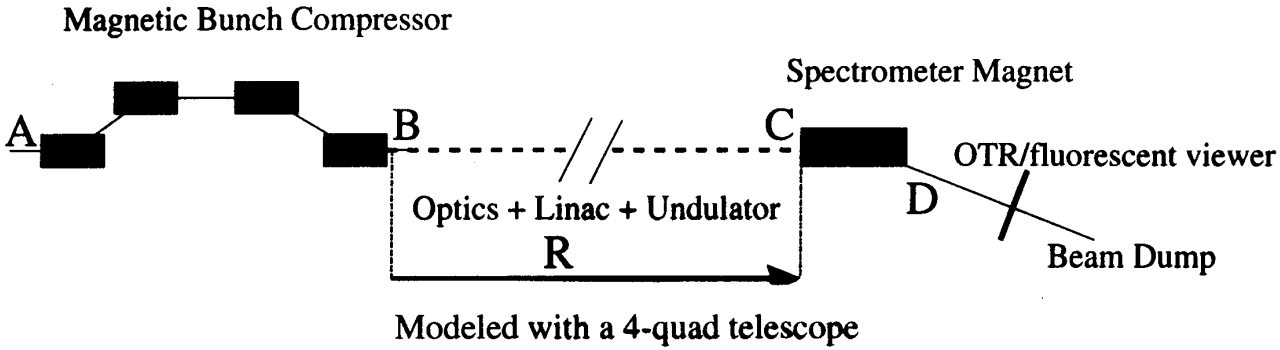


Energy Axis →

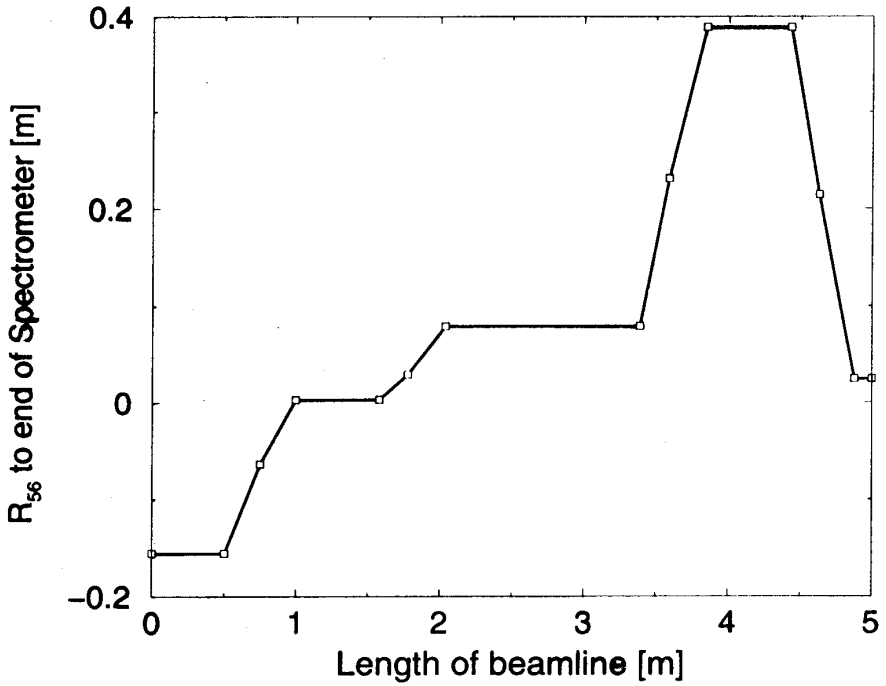
1 pixel ≃ 20 keV
(at 230 MeV)

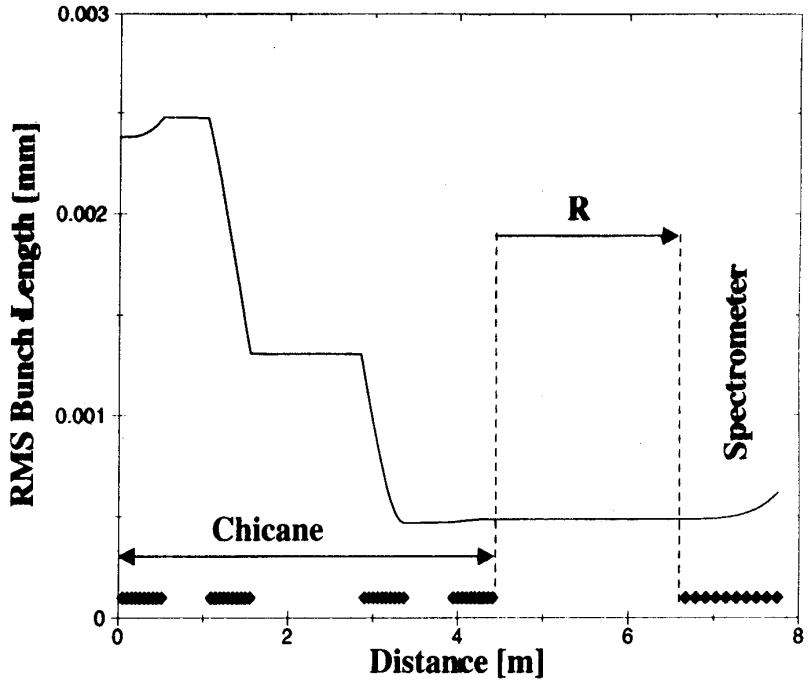

10000
5000
0
2.0 ng
.3 ng
4000
2000
0.7 ng
0.5 ng
0
100
200
300
400
500
600

Modeling of the TTF bendings systems

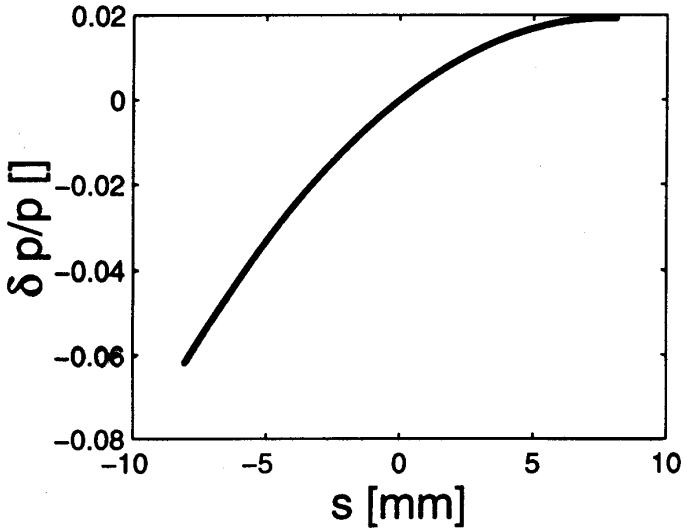


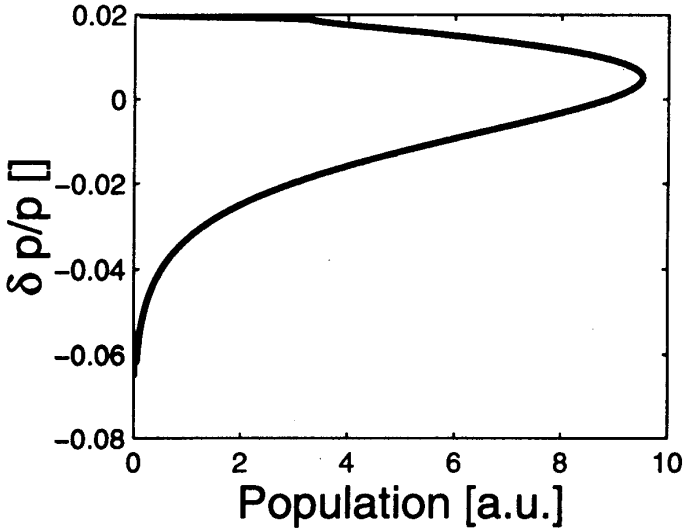
Modeled with a 4-quad telescope

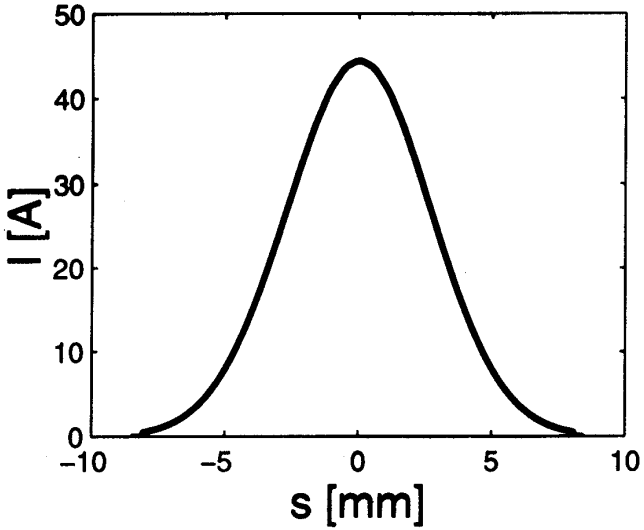




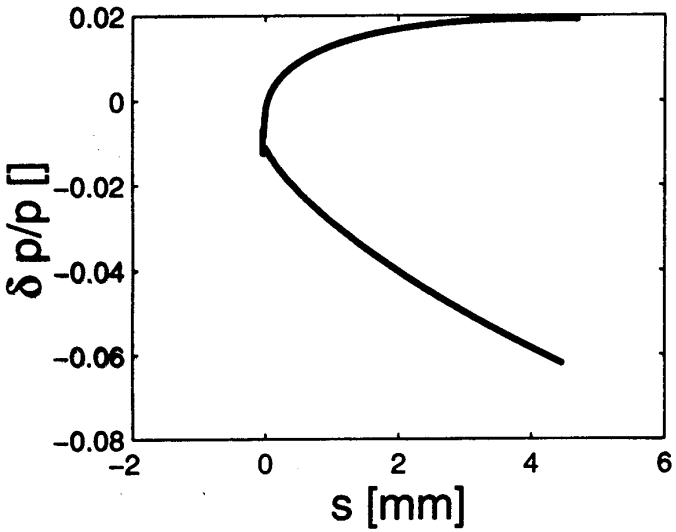
- INCOMING LONGITUDINAL PHASE SPACE -

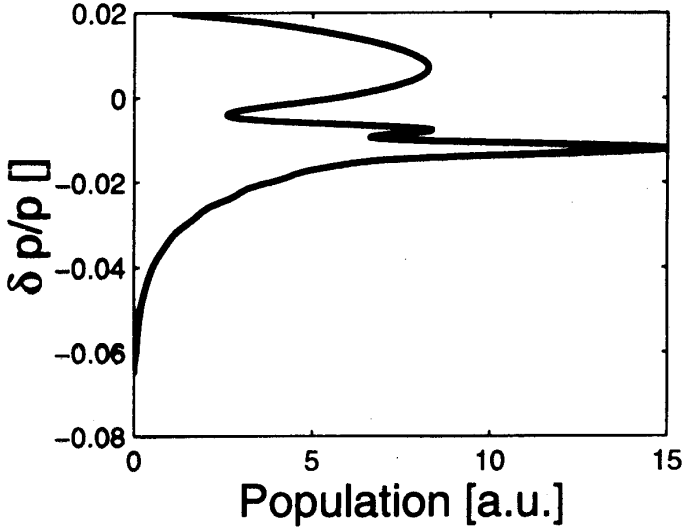


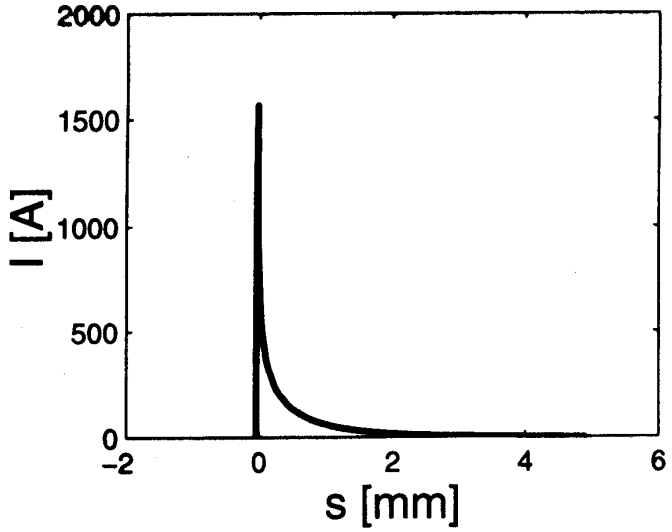




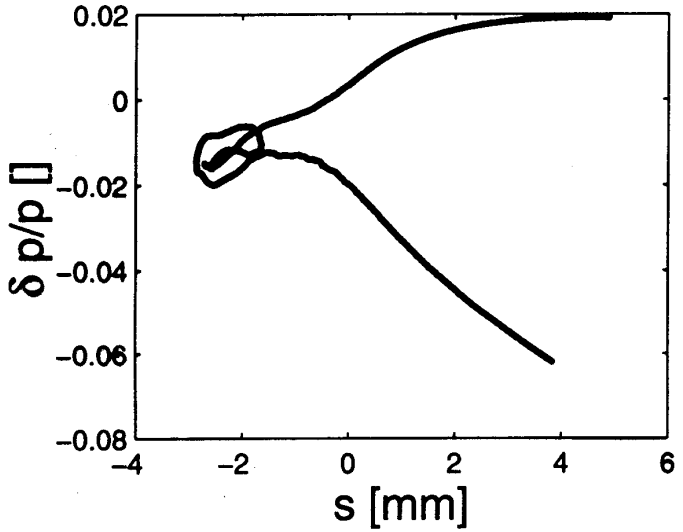
- LONG. PHASE SPACE DOWNSTREAM OF COMPRESSOR -

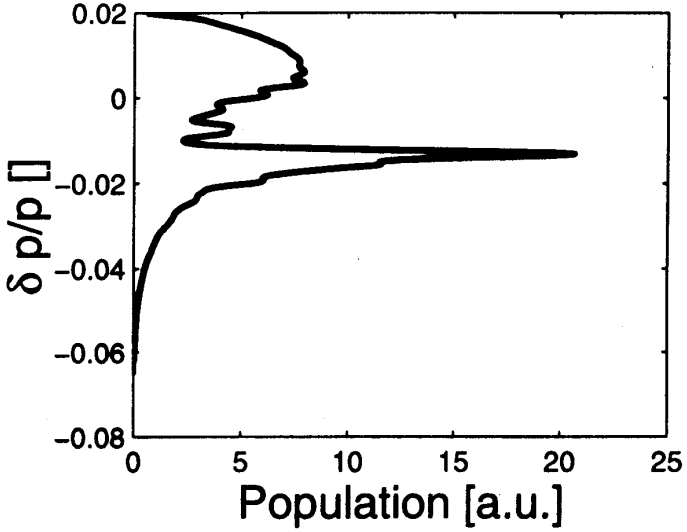


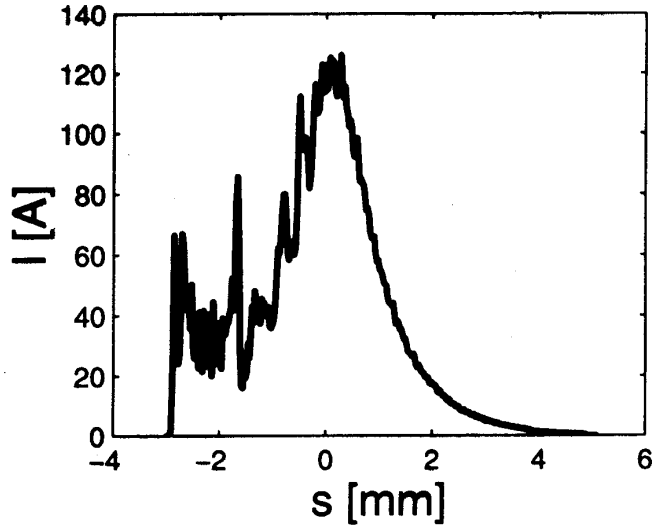




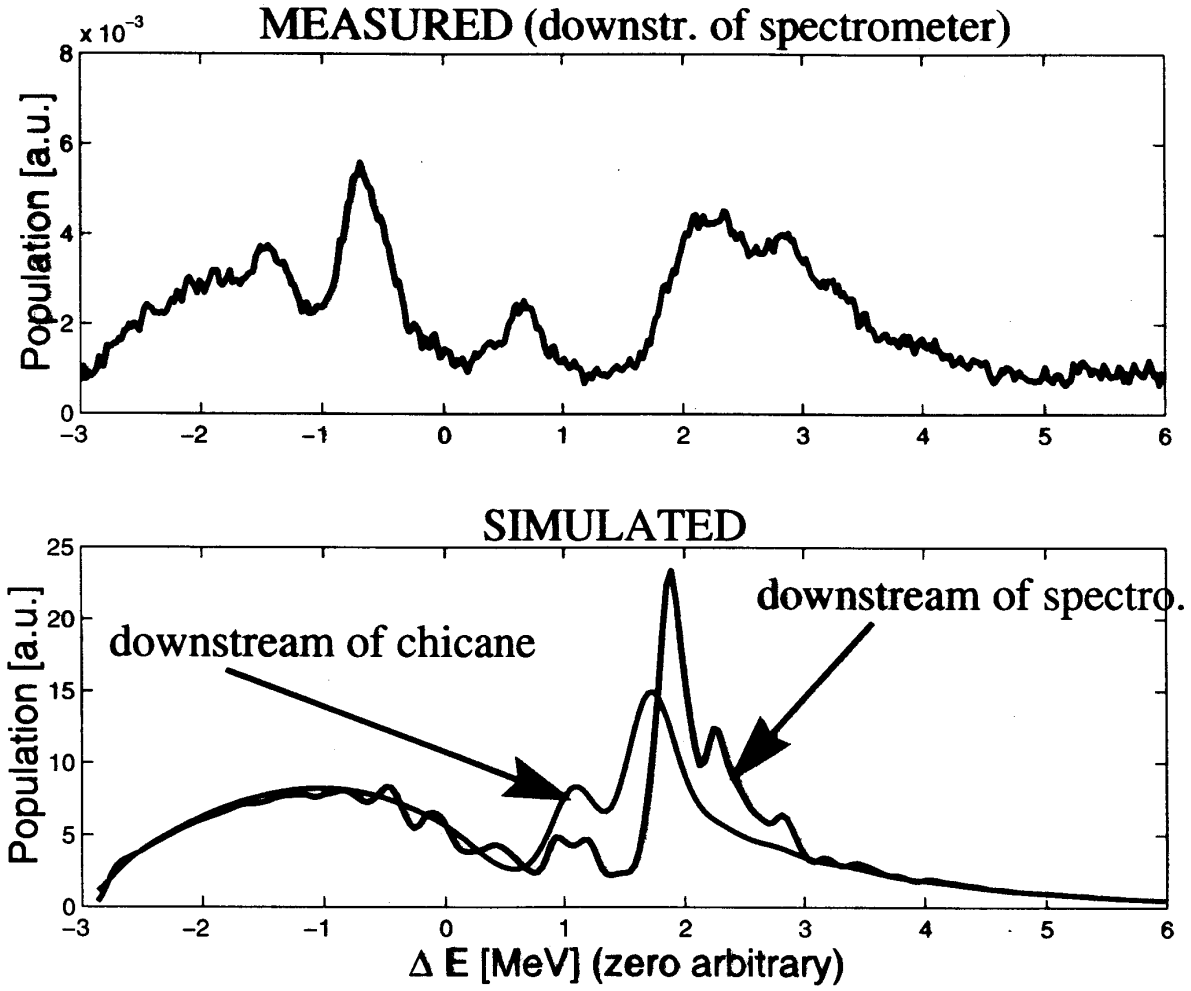
- LONG. PHASE SPACE MIDDLE OF SPECT. -





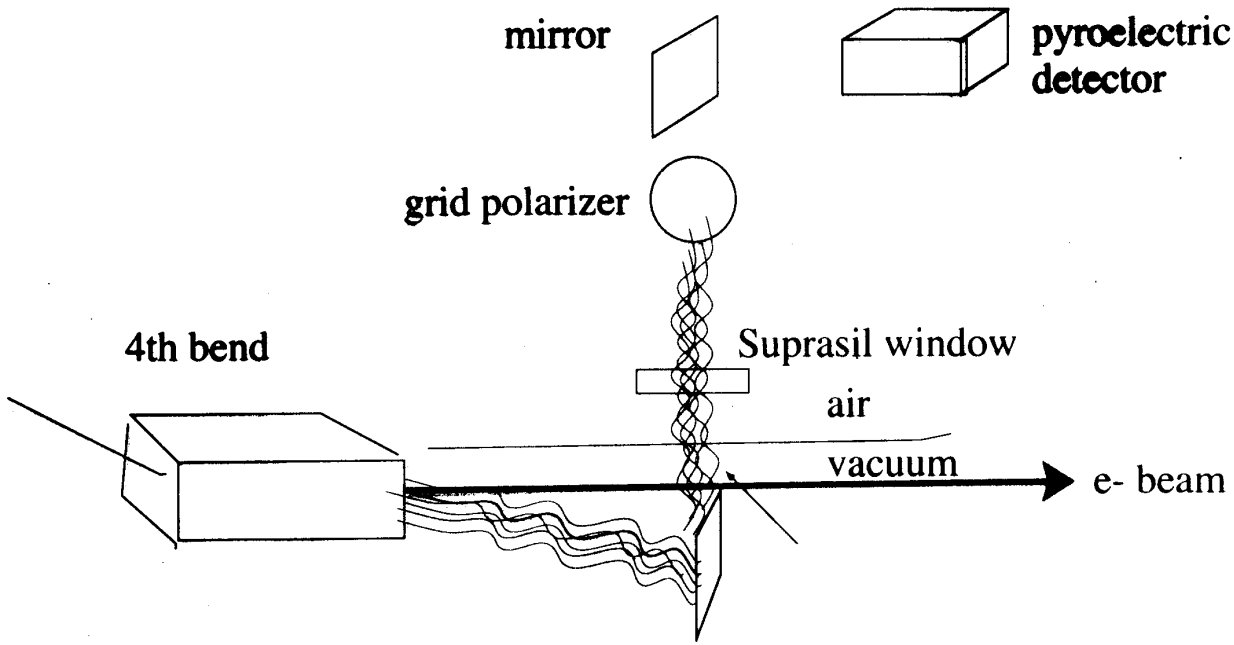


Comparison between measured and expected Energy profile

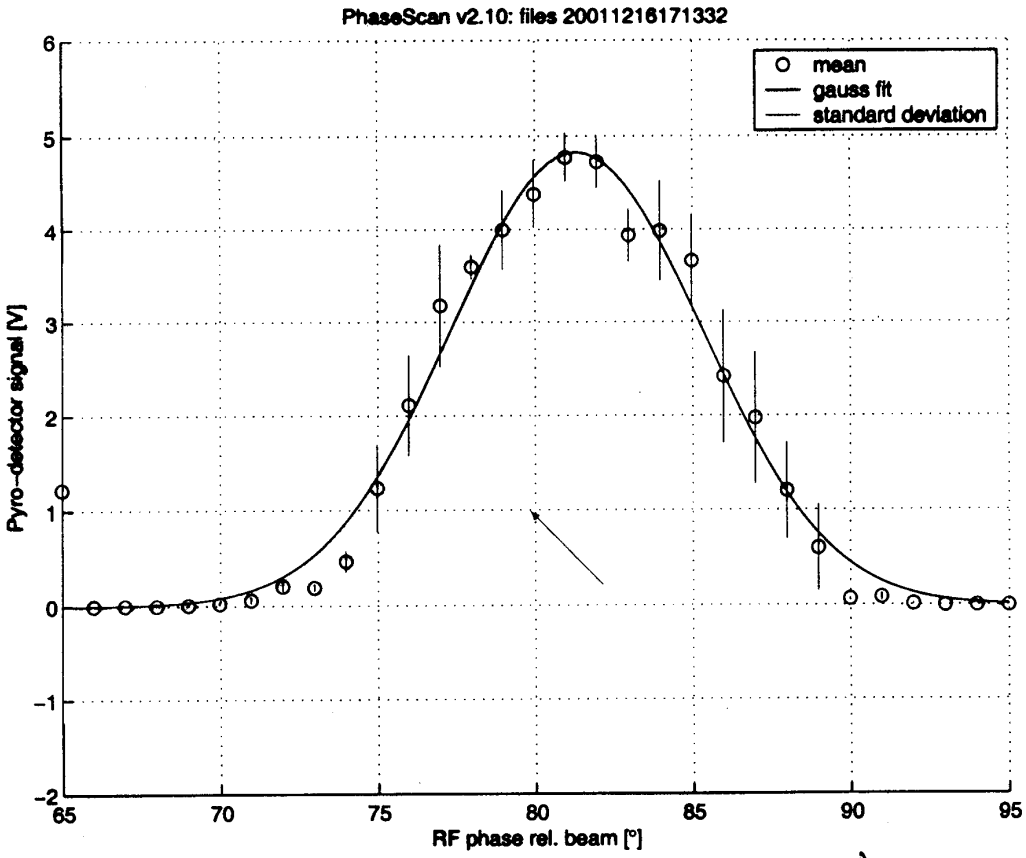


limberg/Piot Deutches Elektronen Synchrotron

CSR power measurement



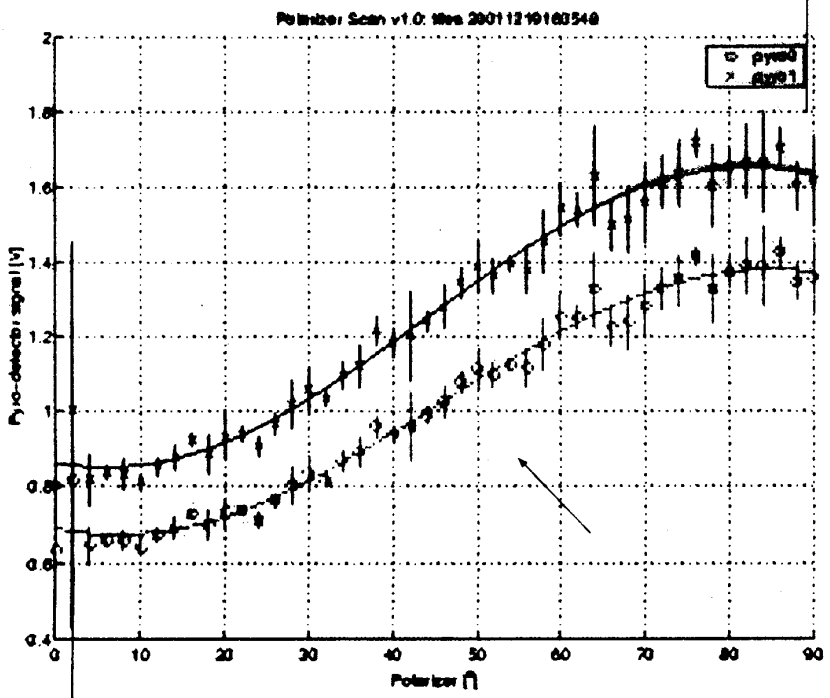
CSR power meas (CNT'D)



(by Menzel)

CSR power meas (CNT'D)

only bending plane
polarization transmitted



only vertical
polarization transmitted

(Menzel)