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# Accelerator Research in Uppsala

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# EuroTeV

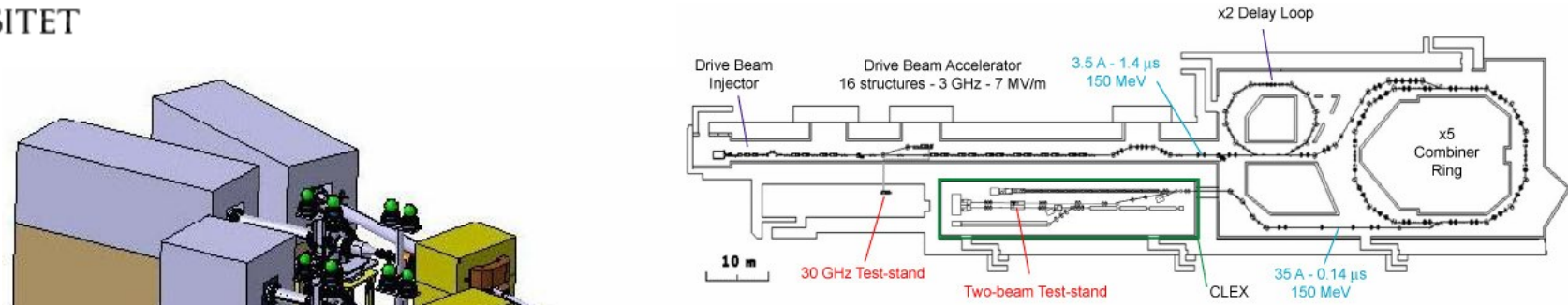


- Post-collision line for multi-TeV CLIC (AF, VZ)
  - Safely dispose of 14 MW beams after collision
    - when in collision (low-energy tail, losses)
    - when not in collision (drill hole in dump window)
  - Diagnostics, e.g. beamstrahlung by Cerenkov detector for muons behind final dump
- Confocal Resonator BPM (AF)
- Emittance tuning bumps (PE wsf DS)



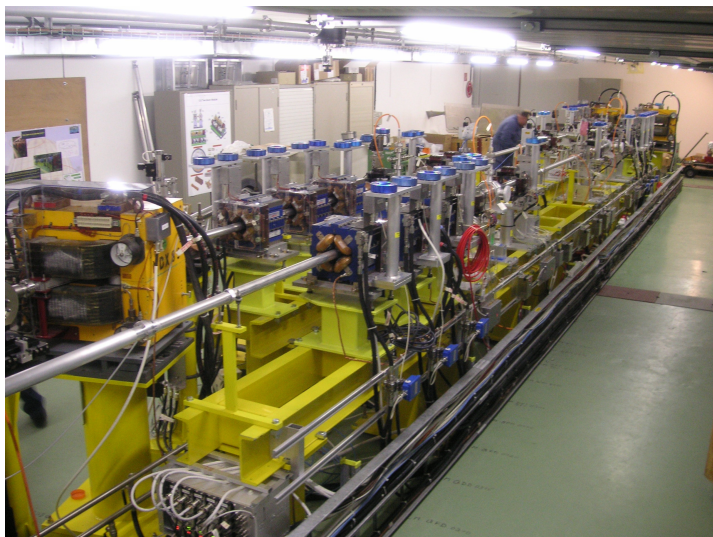
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# CTF3 Two-beam Test-stand



2 x 15 m beam line with supports, magnets, vacuum components, diagnostics: BPM, OTR, spectrometer

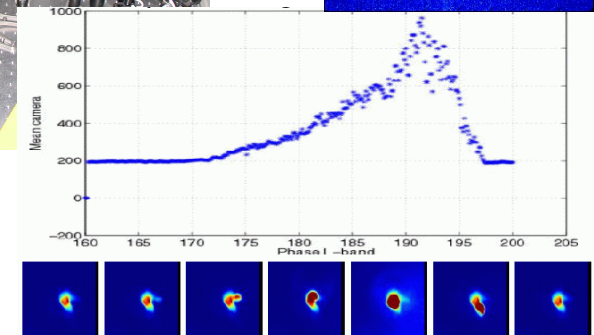
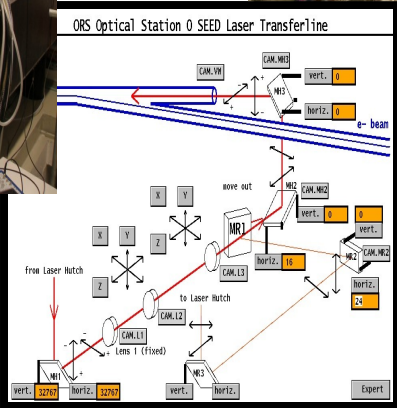
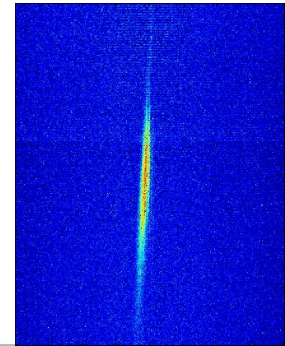
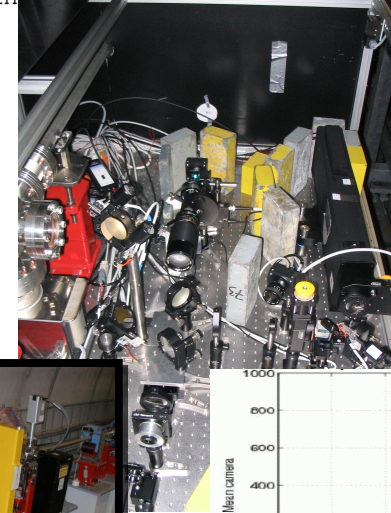
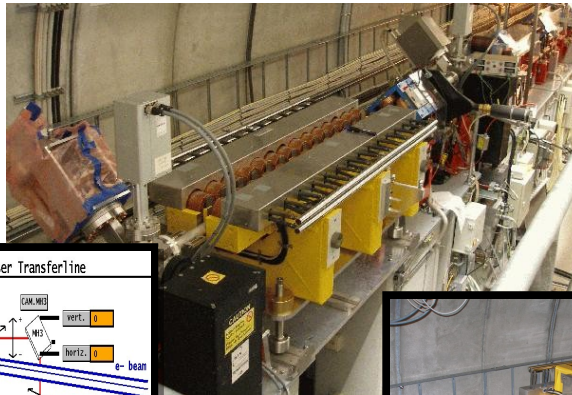
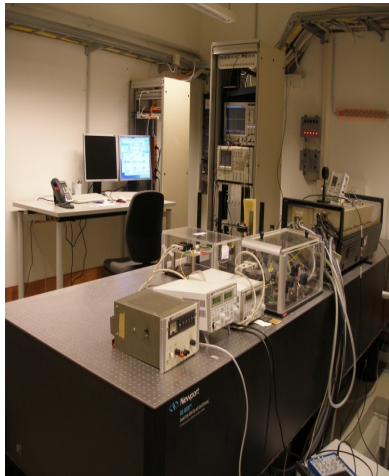
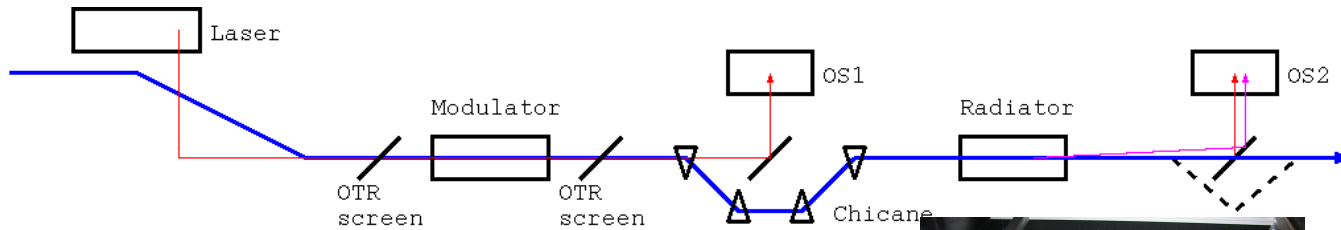
Upgrade in FP7



Financed by Swedish Research Council and the Wallenberg Foundation

# Optical Replica Synthesizer in FLASH at DESY

- Measure femto-second long electron bunches by making optical replica of electron bunch



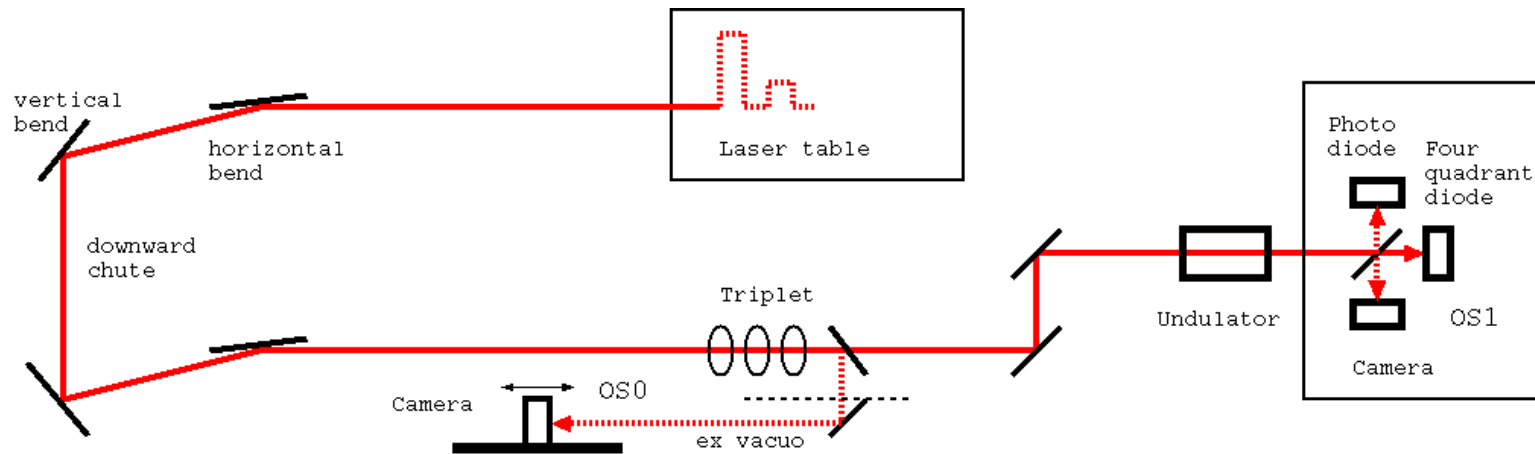
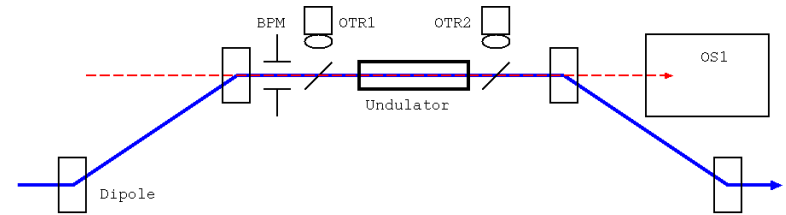


# Spin off: XFEL Laser Heater



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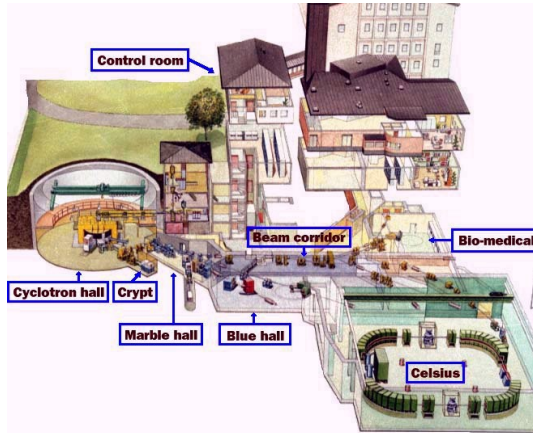
- Electrons are born very cold (3 keV)
  - susceptible to plasma oscillation instabilities
- Add Landau damping (decoherence) in a well controlled way
  - Laser Heater
- In-kind contribution to XFEL
- OK'ed by Swedish VR



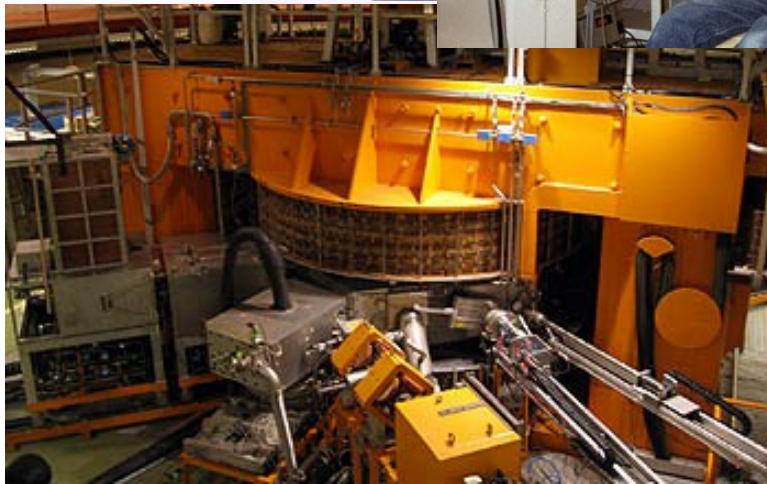


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# From GWI to TSL to Skandion clinic Cancer therapy in Uppsala



- Skandion clinic in Uppsala with new accelerator
- Several treatment rooms with 2+1 gantries
- 1000-2500 patients/year



UNT

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## Pengar klara för nya cancerkliniken

Sveriges åtta universitetssjukhus har fått klartecken för finansieringen av den så kallade Skandionkliniken, en ny cancerklirik för protonterapi som ska byggas i Uppsala.



- First-ever cancer patient treated with protons in 1957 in Uppsala

EuroTeV 080828

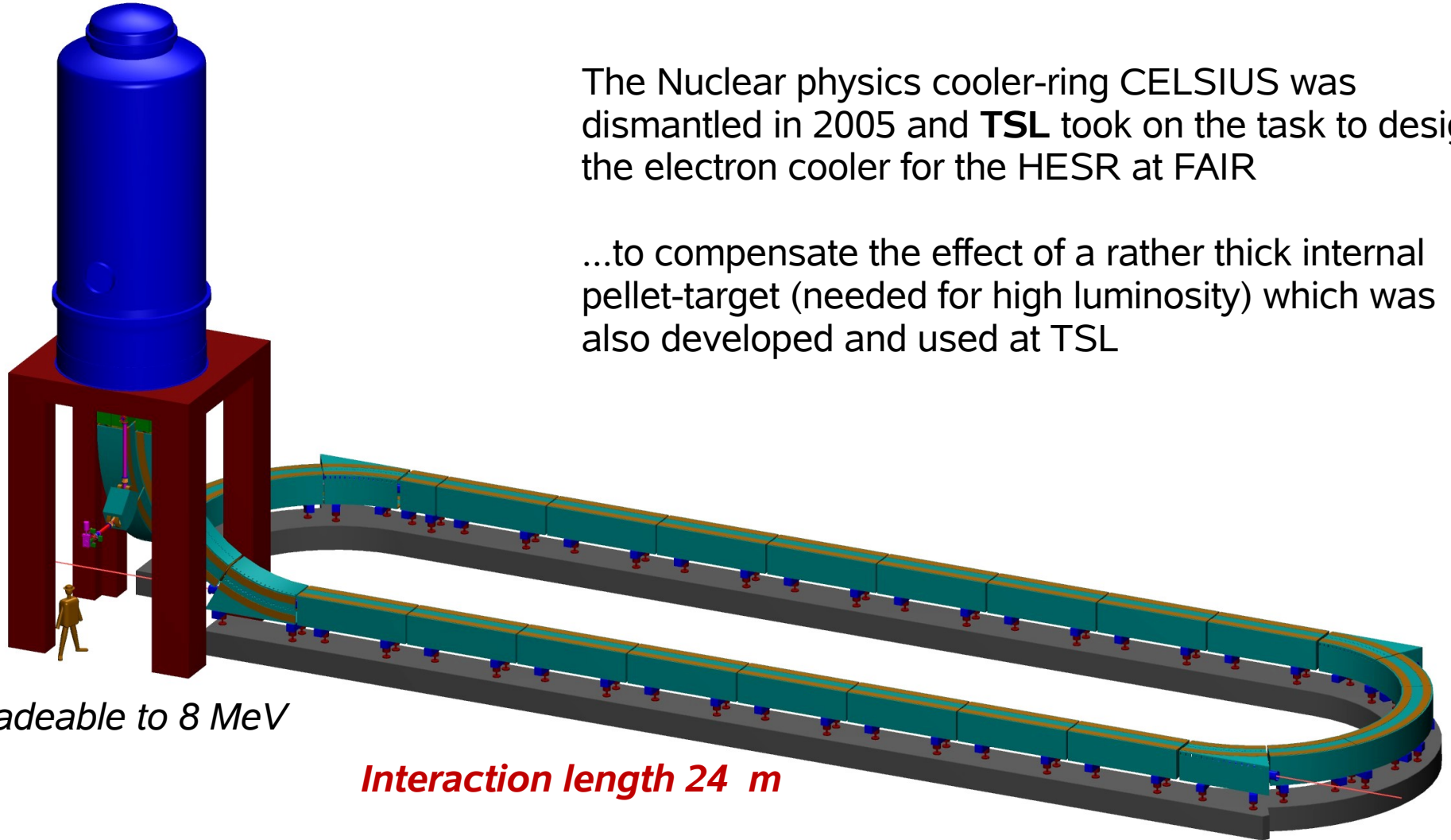
V. Ziemann: Accelerator Research in Uppsala



# HESR Electron Cooler

The Nuclear physics cooler-ring CELSIUS was dismantled in 2005 and **TSL** took on the task to design the electron cooler for the HESR at FAIR

...to compensate the effect of a rather thick internal pellet-target (needed for high luminosity) which was also developed and used at TSL



*Upgradeable to 8 MeV*

***Interaction length 24 m***



# Center for Accelerator and Instrumentation Development

- Cutting edge science at large multi-national facilities
  - CERN for **high-energy physics**, ESRF, ALS, MAX for **synchrotron radiation sciences**, Observatories in Spain and Chile for **astronomy**
- This trend continues in the future
  - XFEL, FAIR, ILL, ESO/ESA, ESS, Max IV
- In-kind contributions for construction and operation for the facility itself and its instrumentation i.e. the Accelerator and Instrumentation
- Need a strong **home base** as platform to launch strong participation in international collaborations → bigger footprint
- Uppsala TekNat faculty founded CAI ([www.cai.uu.se](http://www.cai.uu.se)) in 2007 and we received 1.5 MSeK/y from 7/2008
  - Intermediate level between science and workshops
  - Interface to advanced local infrastructure (MicroSL with 2000 m<sup>2</sup> clean room)
  - Increased collaboration and communication among participating groups