



# ATF2: Laser-wire Scheduling Strategy

Grahame Blair

Second ATF2 Project Meeting,  
KEK,  
31<sup>st</sup> May 2006

- Current Status
- Funding application
- Possible Scheduling Strategy

# ATF Laser-wire

## Oxford

B. Foster, N. Delerue, S. Dixit, F. Gannaway, D. Howell,  
M. Qureshi, A. Reichold, R. Senanayake

## Royal Holloway (UL)

A. Agapov, G. Blair, S. Boogert, G. Boorman, A. Bosco,  
J. Carter, L. Deacon, P. Karataev, M. Price

## CCLRC Daresbury

L. Jenner

## KEK

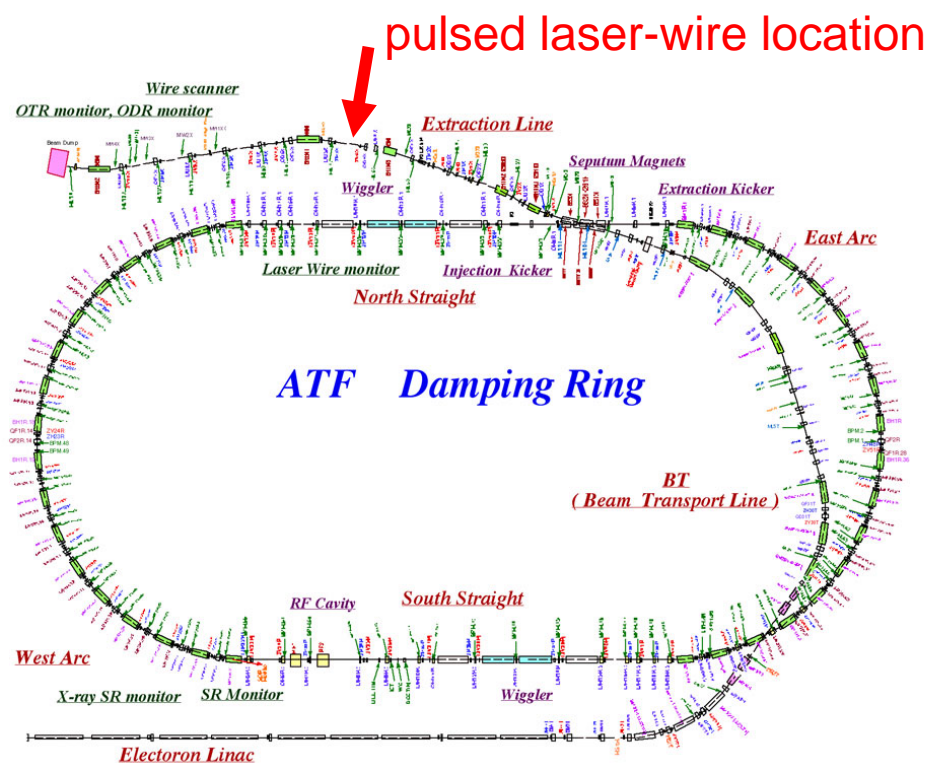
A. Aryshev, H. Hayano, K. Kubo, N. Terunuma,  
J. Urakawa

## SLAC

A. Brachmann, J. Frisch, M. Ross

# ATF Laser-wire

- At ATF, we will aim to measure micron-scale electron spot-sizes with green (532 nm) light.
- Aim at intra-train (fast) scan for 150 ns bunch spacing.
- The final spot-size measurable at ILC will have implications for the length and layout of the BDS diagnostics section.
- The ATF/ATF2 results will be crucial to determine the technical boundaries.



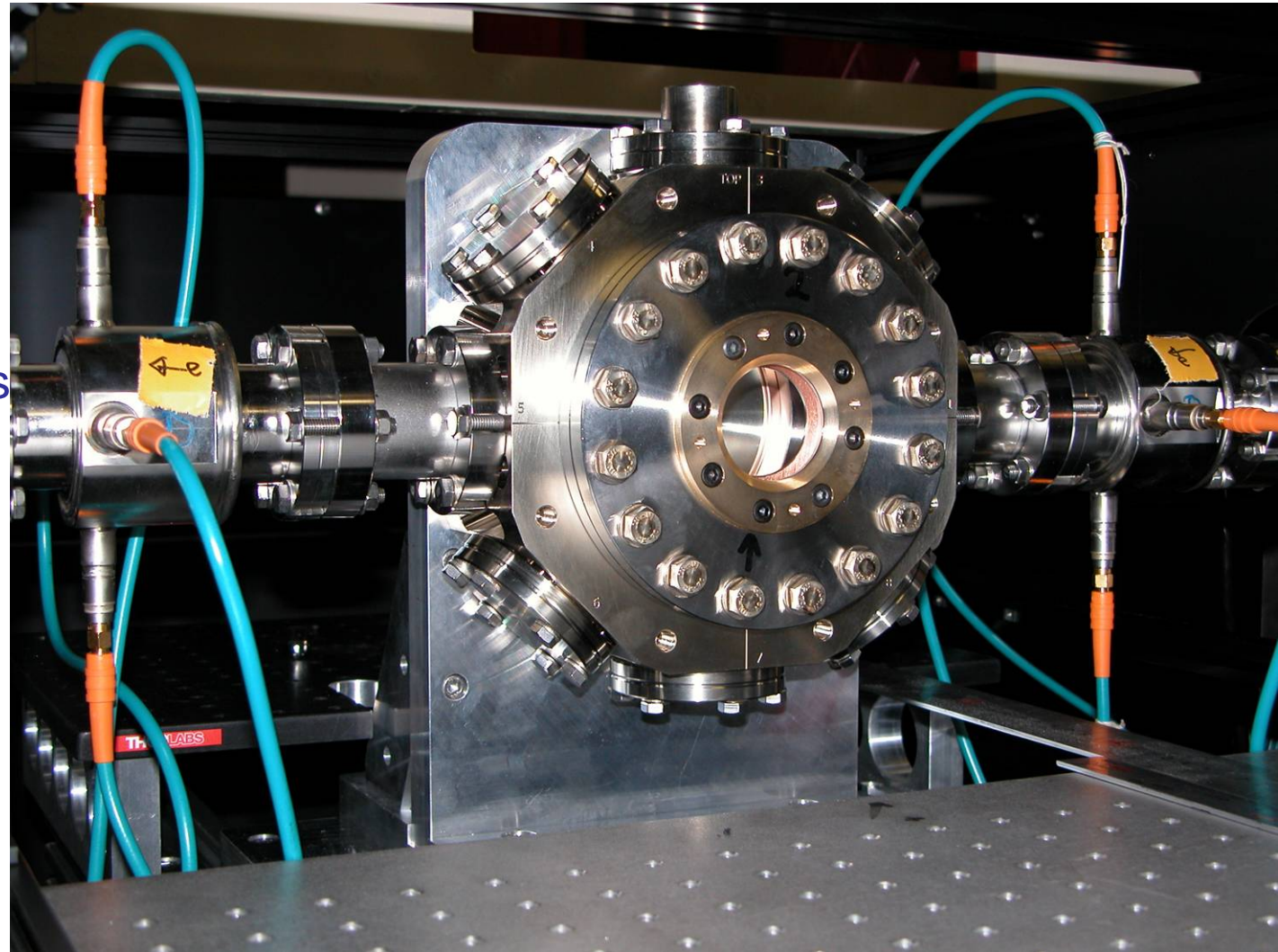
# ATF Laser-wire

Vacuum chamber built in Oxford and Installed in ATF extraction Line in December 2006.

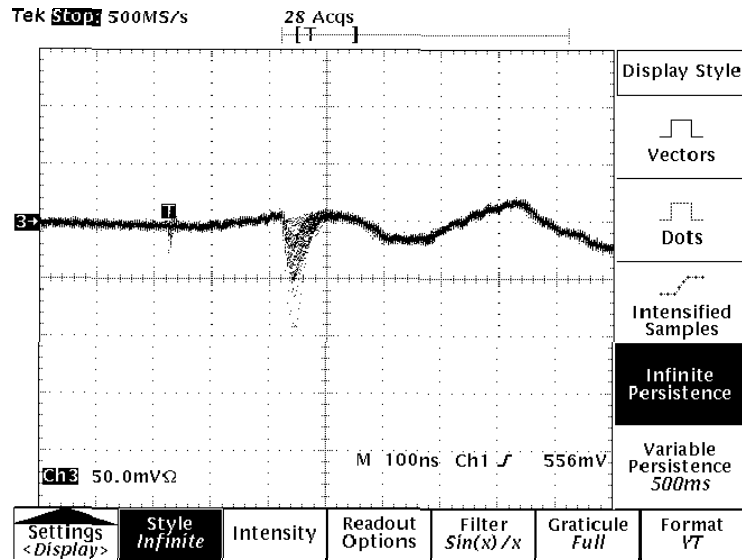
Laser light transported to IP.

Commercial lens for early tests

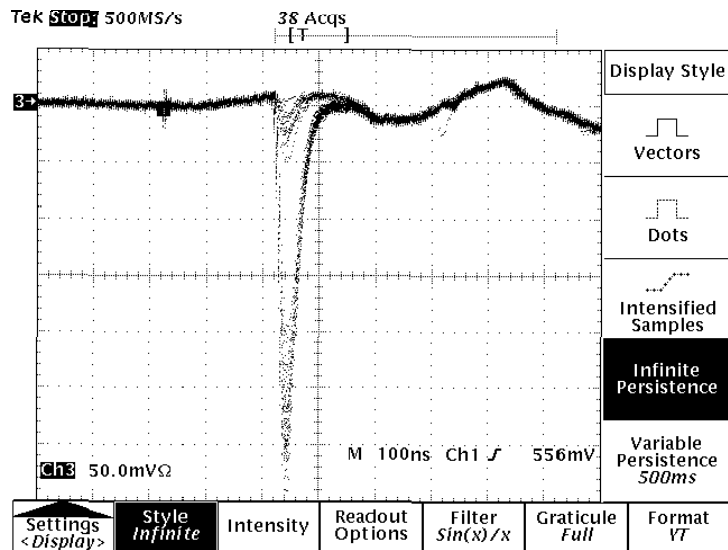
Upgrade to f2 optics in Autumn 06.



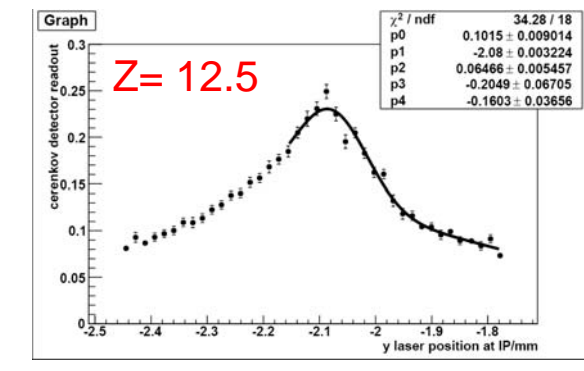
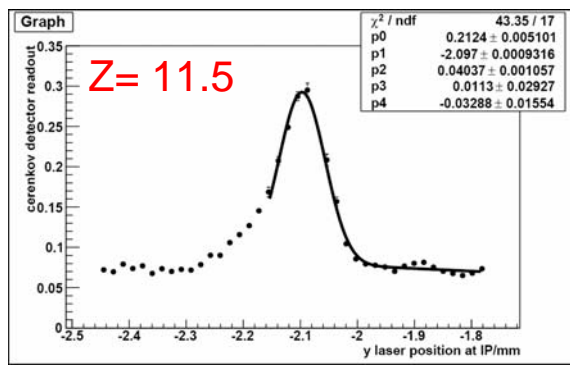
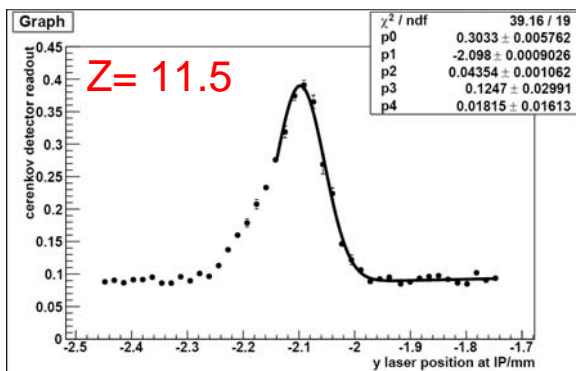
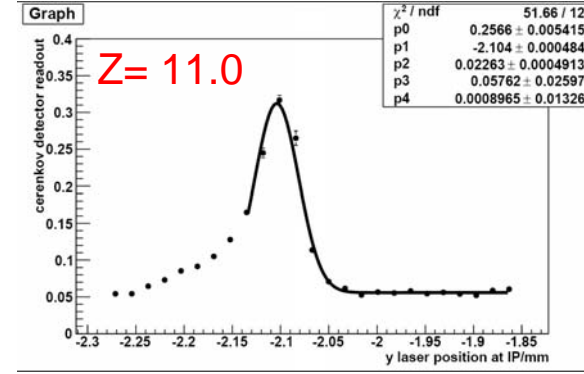
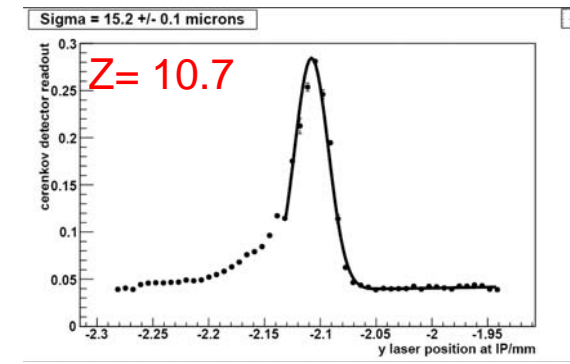
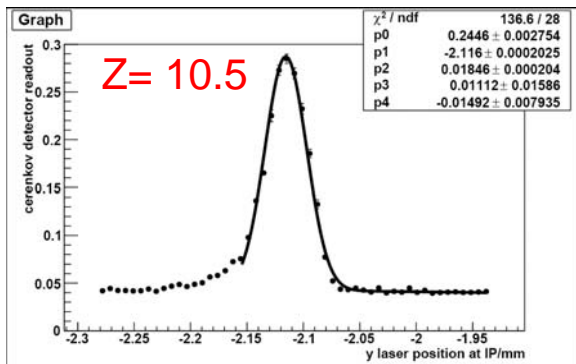
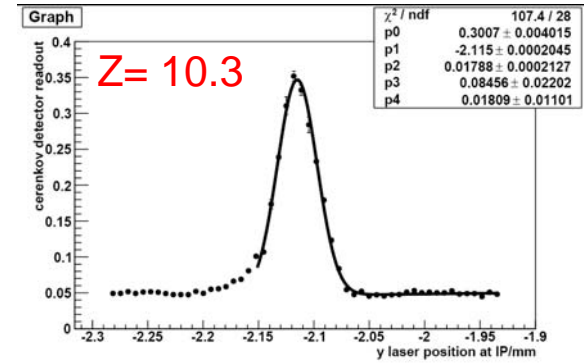
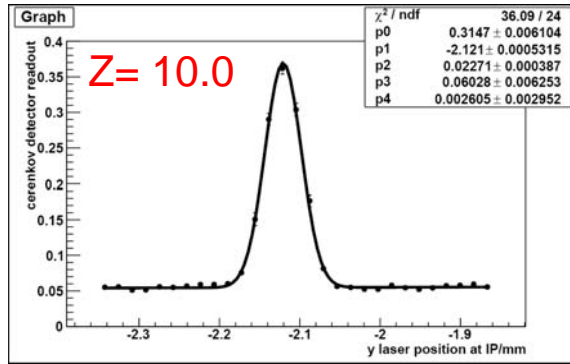
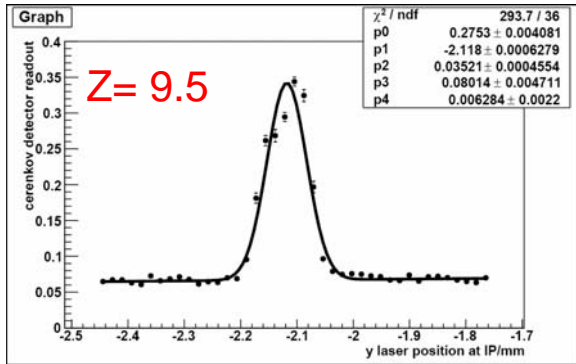
# Collisions Seen



- Left: scope traces of Cherenkhov detector signal
- Top: laser shutter closed
- Bottom: laser shutter open

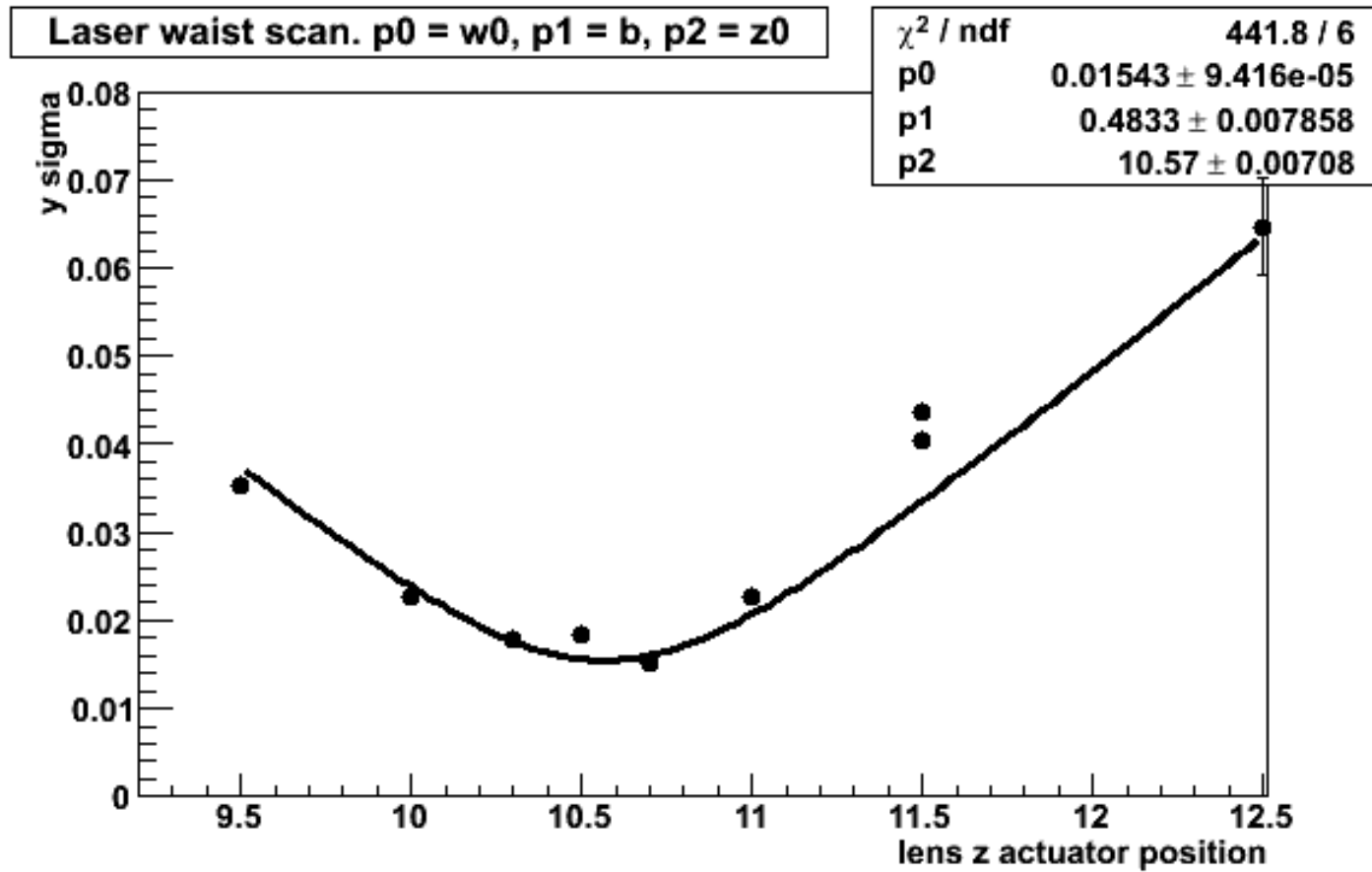


# Vertical scans at different laser-z positions





## Scan of laser waist with electron beam



# ATF LW Plans

- Data runs ongoing
- More runs 06/07; lots of systematics to understand (eg beam jitter, BPM integration ...)
- Integrate solid wire scanner into vac. vessel design
- Iteration on lens design.
- Provide statement to GDE on technical feasibility of reliable micron-scale LW

## Longer term:

- Play a major role in ATF2 LW system.
- Multiple IP's, laser system, light transport.
- Investigate LW emittance measurement scheme for ILC.
- Investigate frequency tripled light?



# ATF2 LW Plans

A Staged approach is most likely

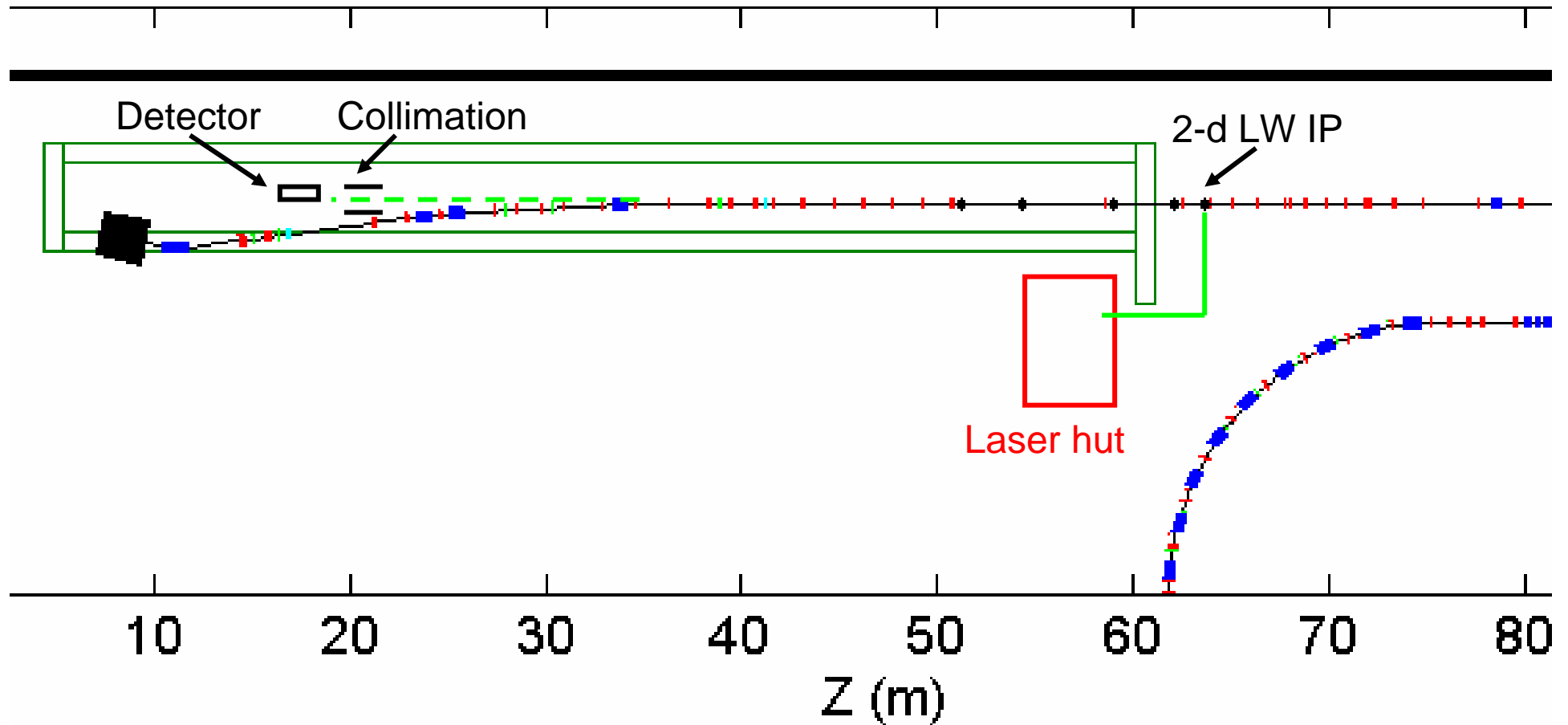
New funding proposal is currently in preparation for the period 2007-2010

Outcome should be known around end of 2006

Depending on outcome of this proposal:

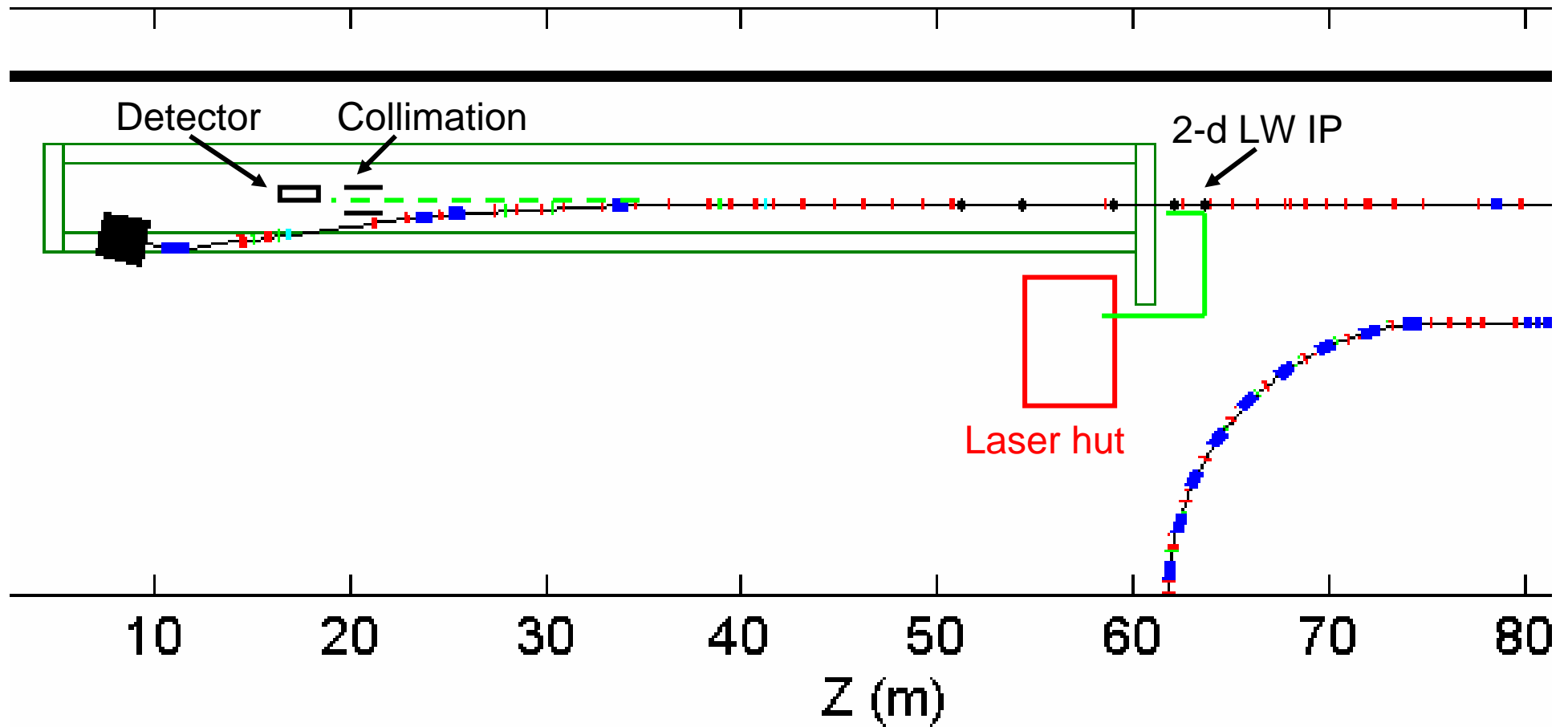
- Start with installation of laser hut
- First stage of light transport system
- Single 2-D LW-IP system
- Test performance of this LW IP.

## Possible Stage 1



Test design of 2-D IP: if OK, can build additional ones  
Light path = evacuated 4" pipe, containing relay optics  
Full Light pipe may need to be installed at stage 1

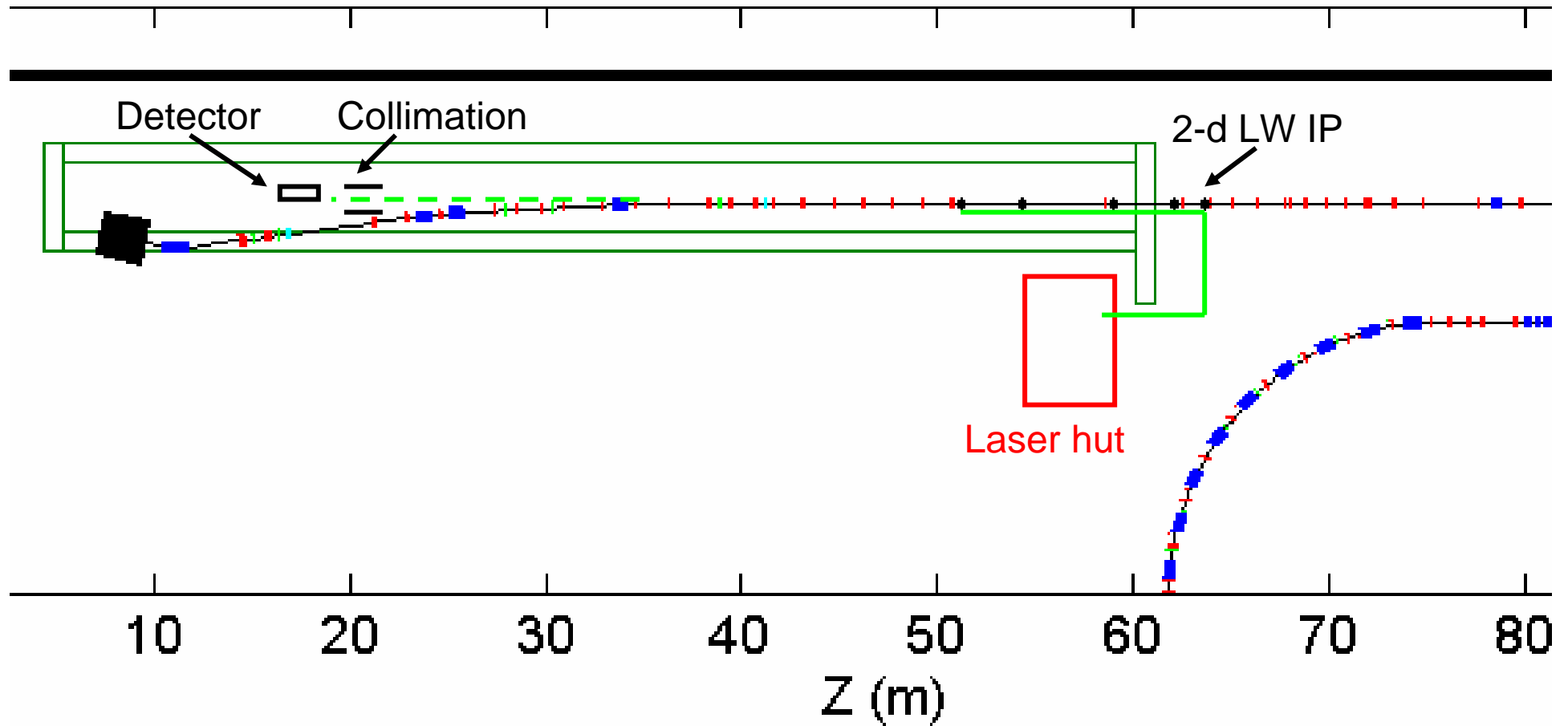
## Possible Stage 2



Understand how to operate two IPs and analyse results

If all is well, can extend to rest of system:

# Possible Stage 3



Final number of IPs will depend on level of funding

# Summary

- ATF LW is very active and producing results
- We expect this to continue into 2007
- Subject to new funding, an exciting ATF2 programme is planned
- Multi-station LW IP system
- A staged approach is advisable, building over the first few years of ATF2 operation.