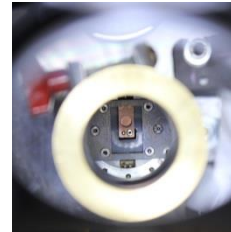
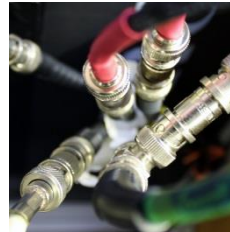


X-VISAR: Simultaneous perpendicular line-imaging VISAR



John Winters

Simon Bland, Sam Stafford, Daniel Eakins, David Chapman

Imperial College London

X-VISAR

- Motivation
- Implementation
- Summary

Why would you want X-hairs on a target?

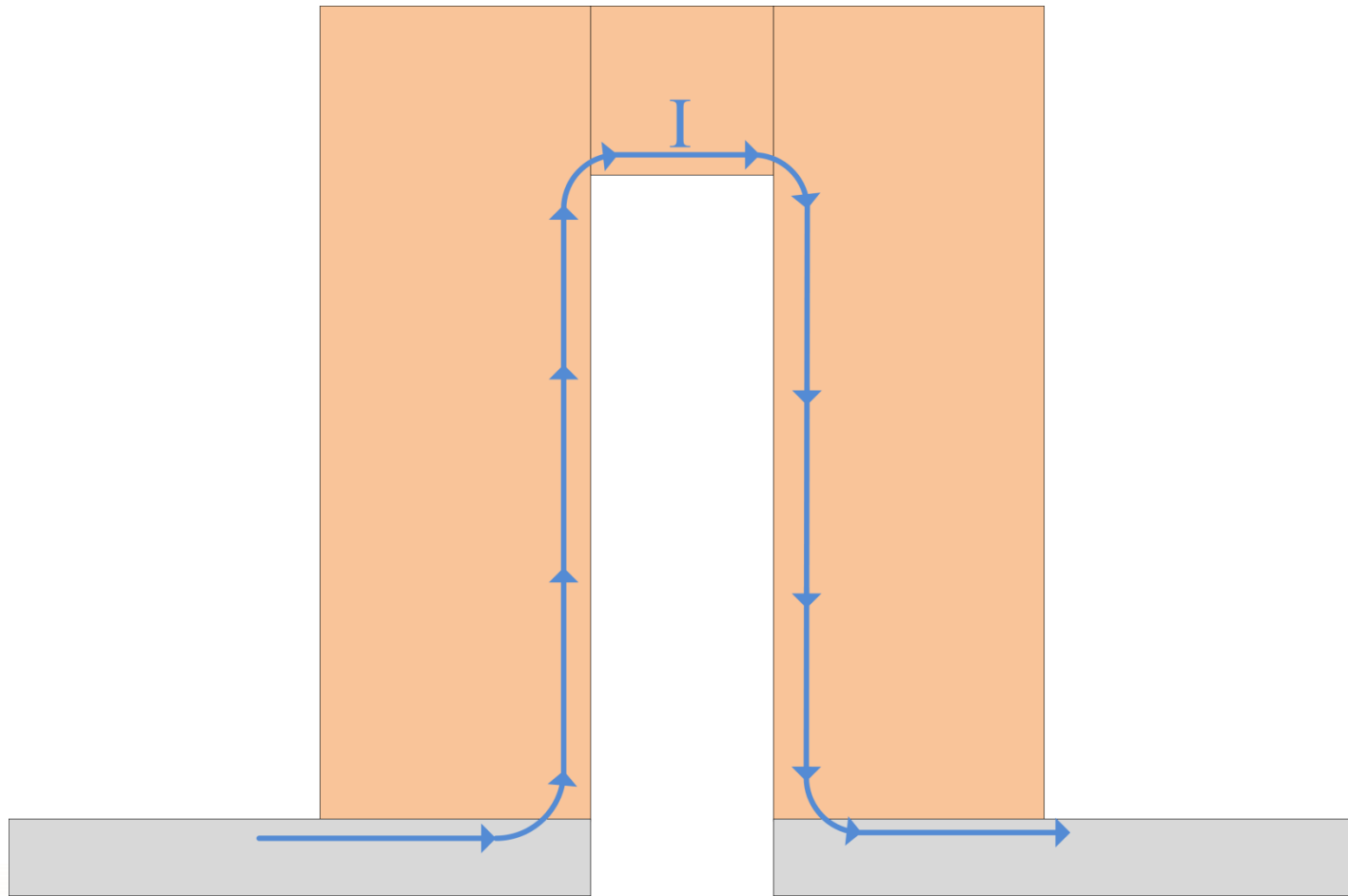
ORTHOGONAL VELOCIMETRY

MACH: A pulsed power generator for ICE

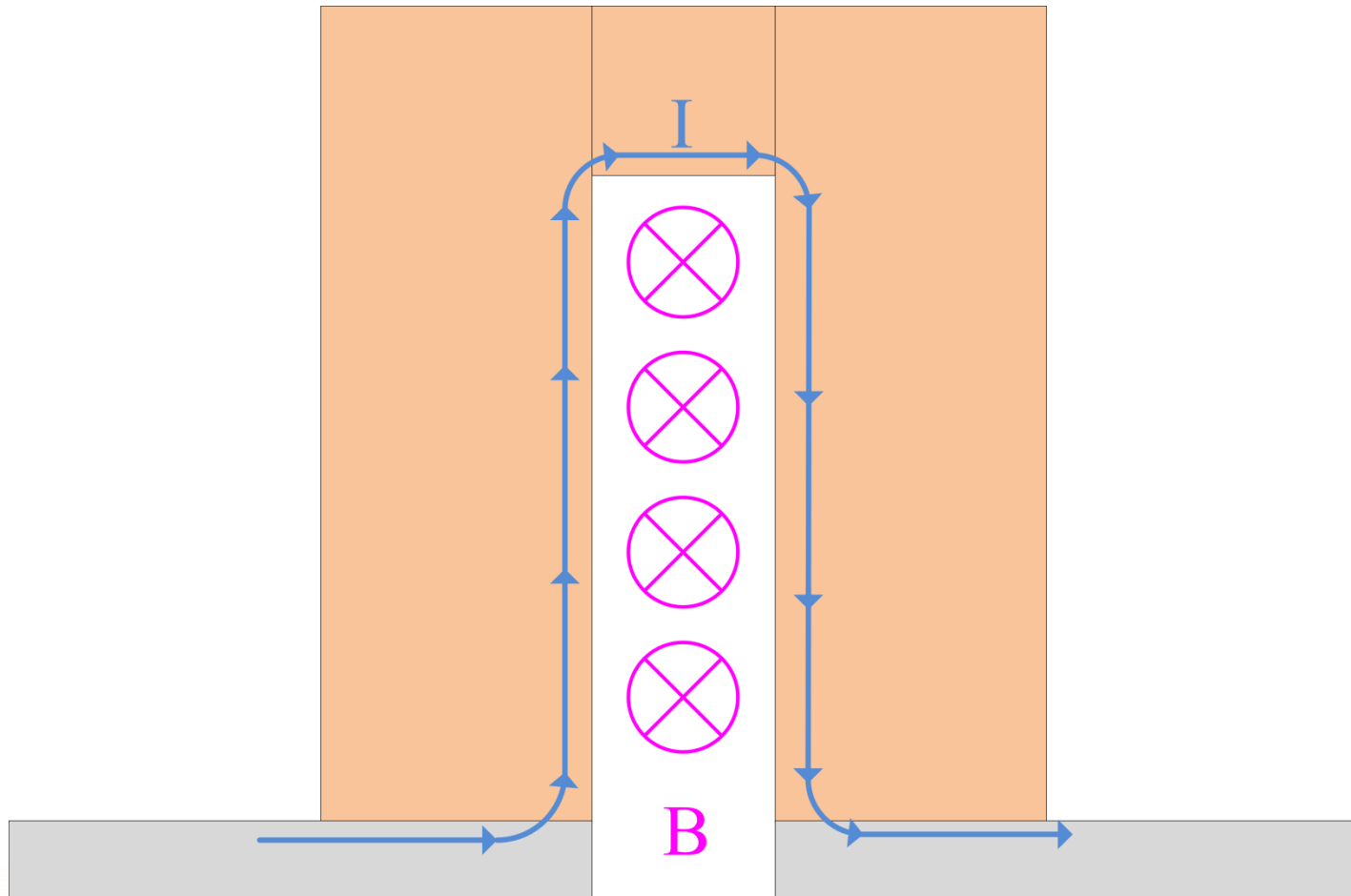


- 2 MA.
- 260ns rise time or pulse shaping.
- Up to 200 kbar.
- Quasi-Isentropic Compression Experiments (ICE).

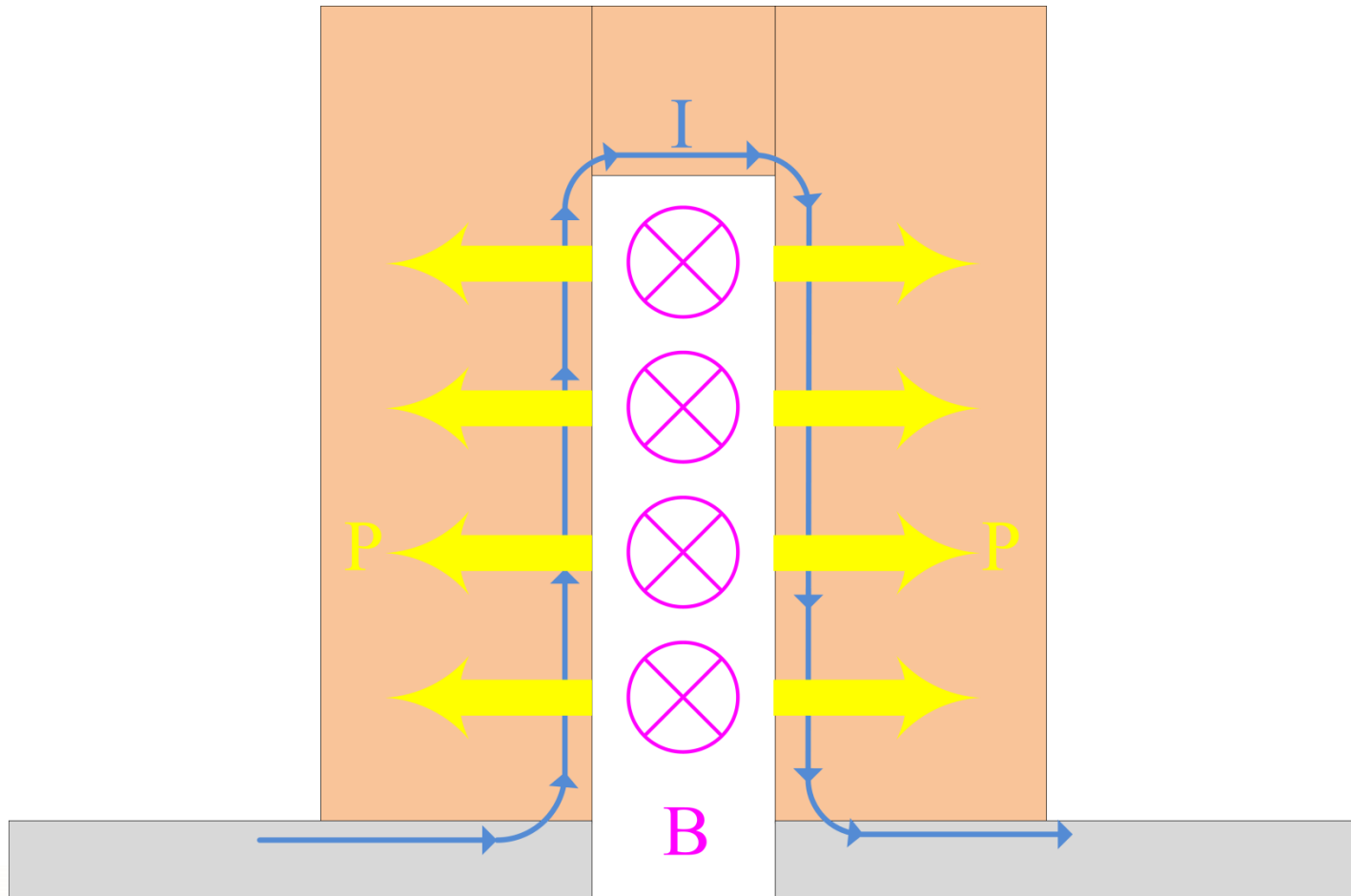
MACH: A simple strip-line



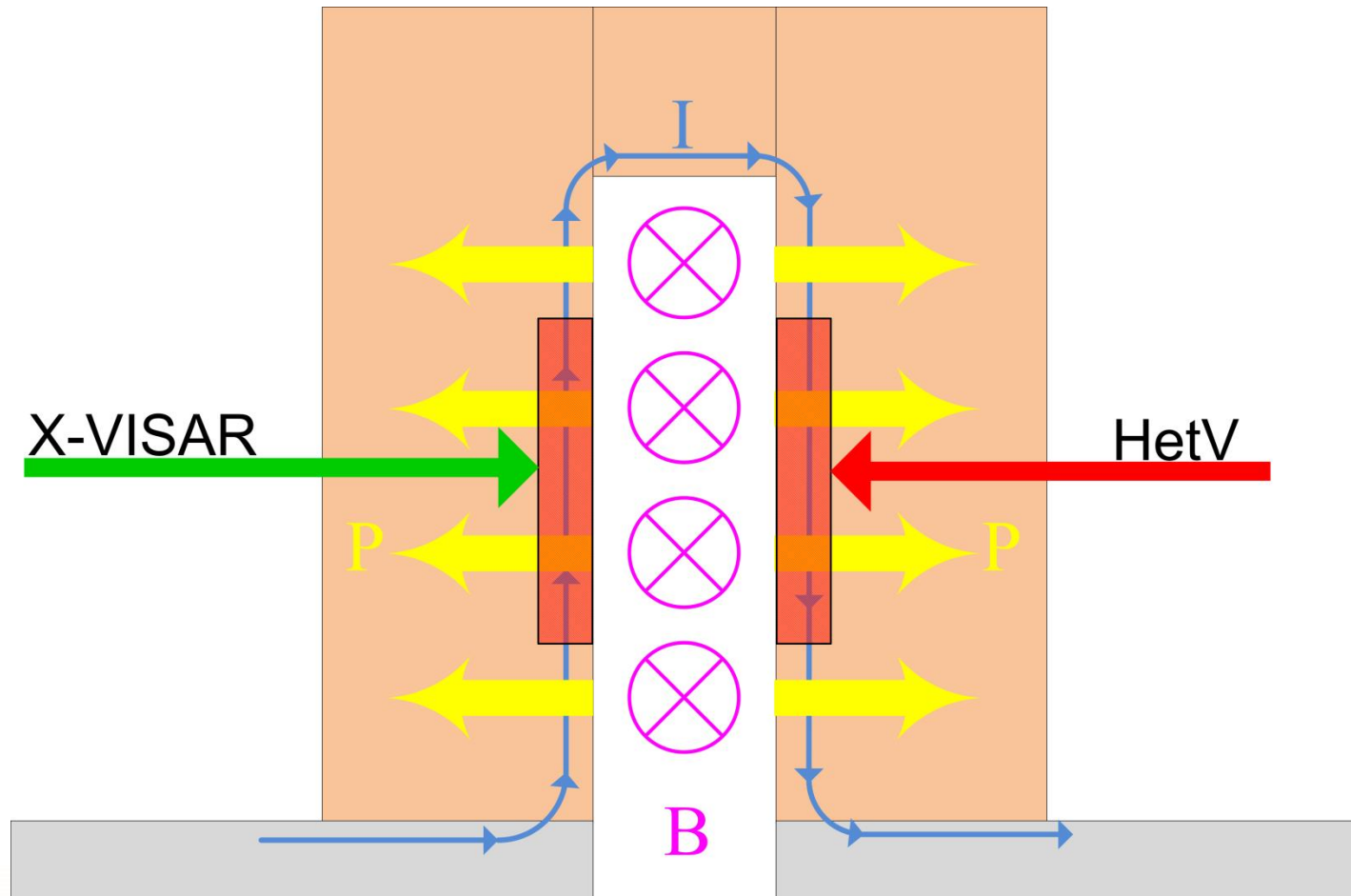
MACH: A simple strip-line



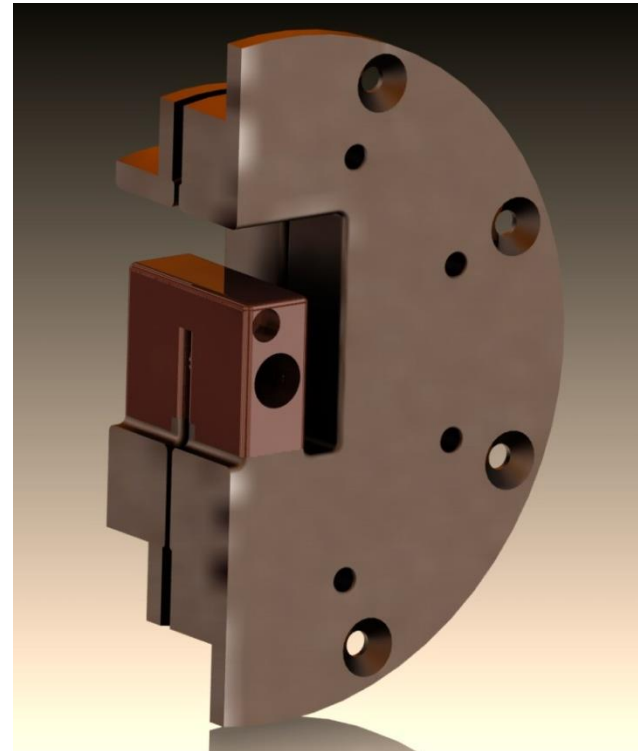
MACH: A simple strip-line



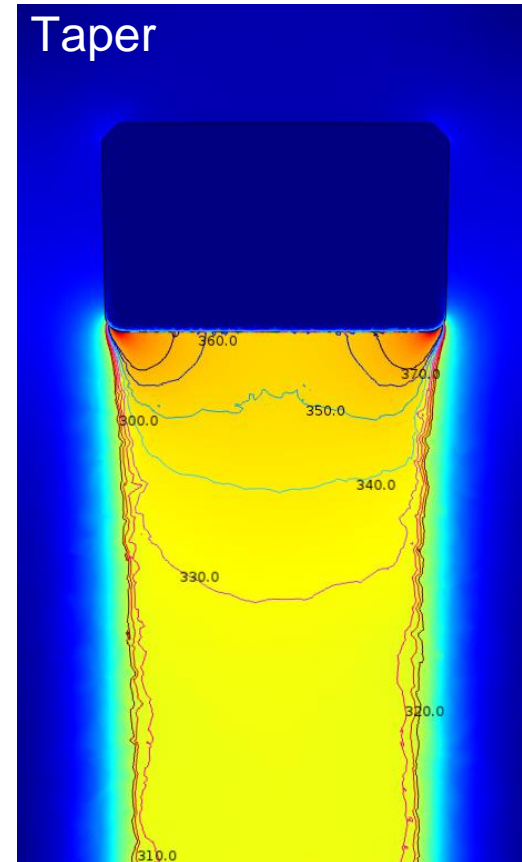
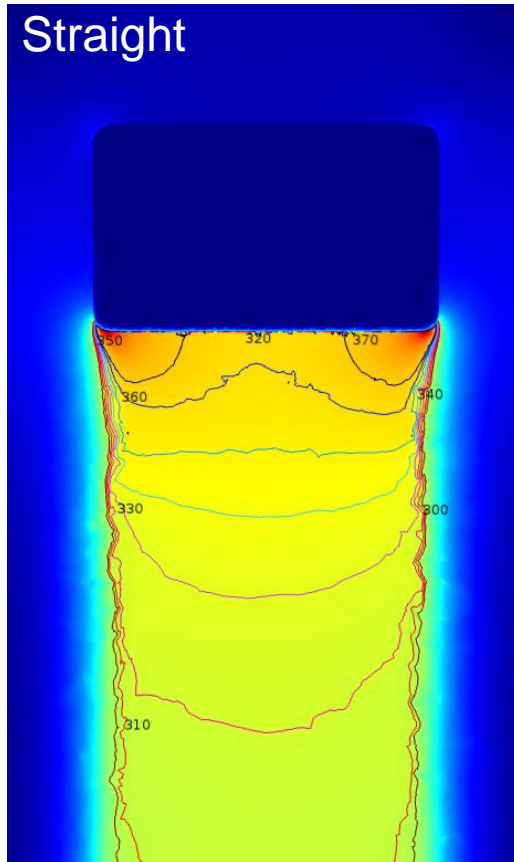
MACH: A simple strip-line



Target design

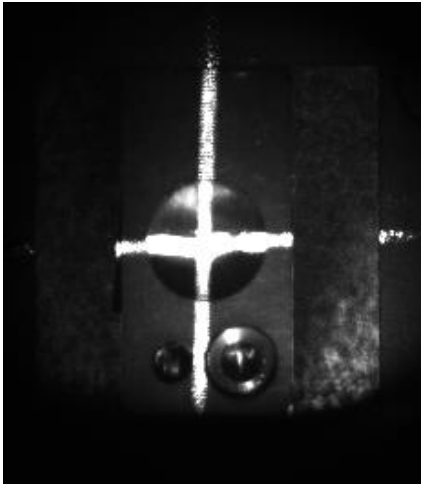


COMSOL modelling



Courtesy of Sam Stafford

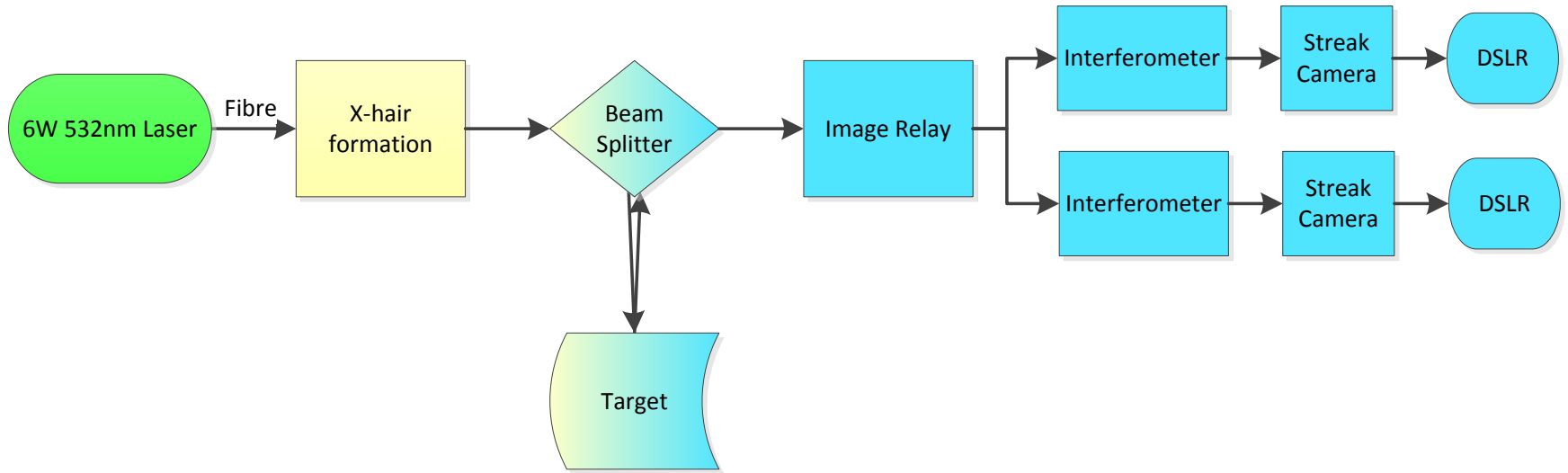
Institute of Shock Physics



Implementing a novel diagnostic

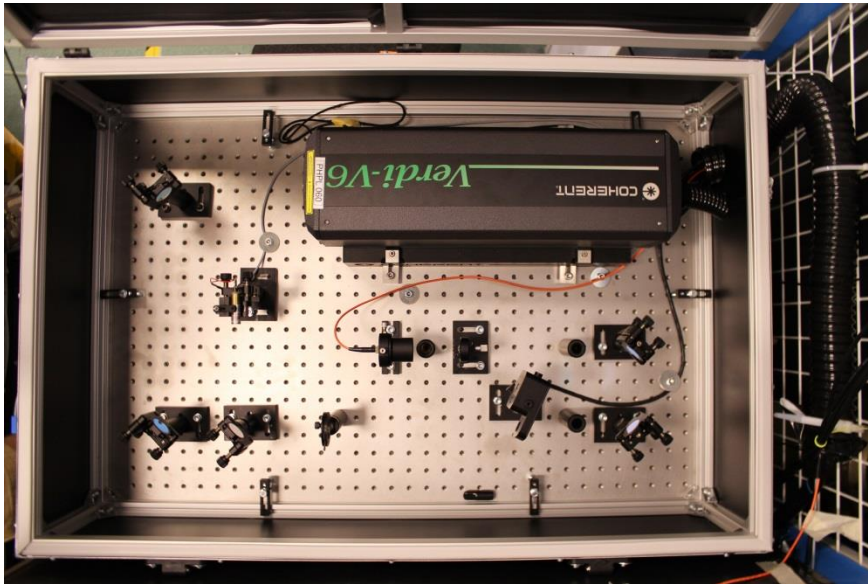
X-VISAR

Optical Arrangement



Optical Arrangement

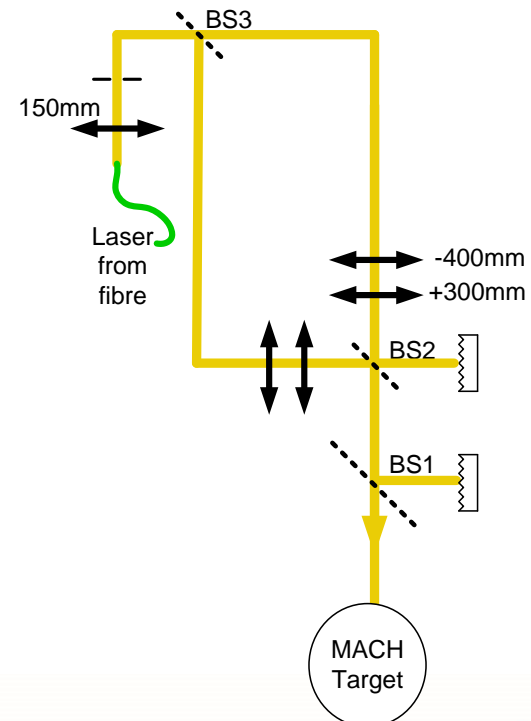
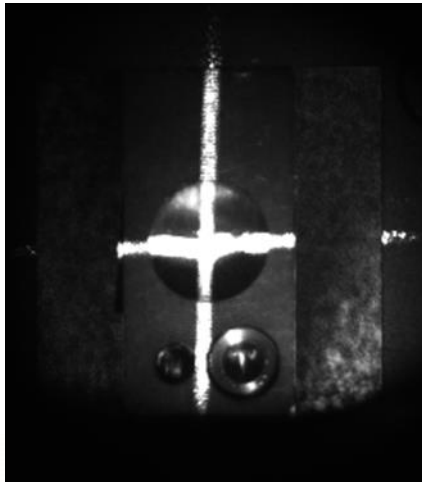
- Laser
 - Shuttered
 - Multi-mode fibre



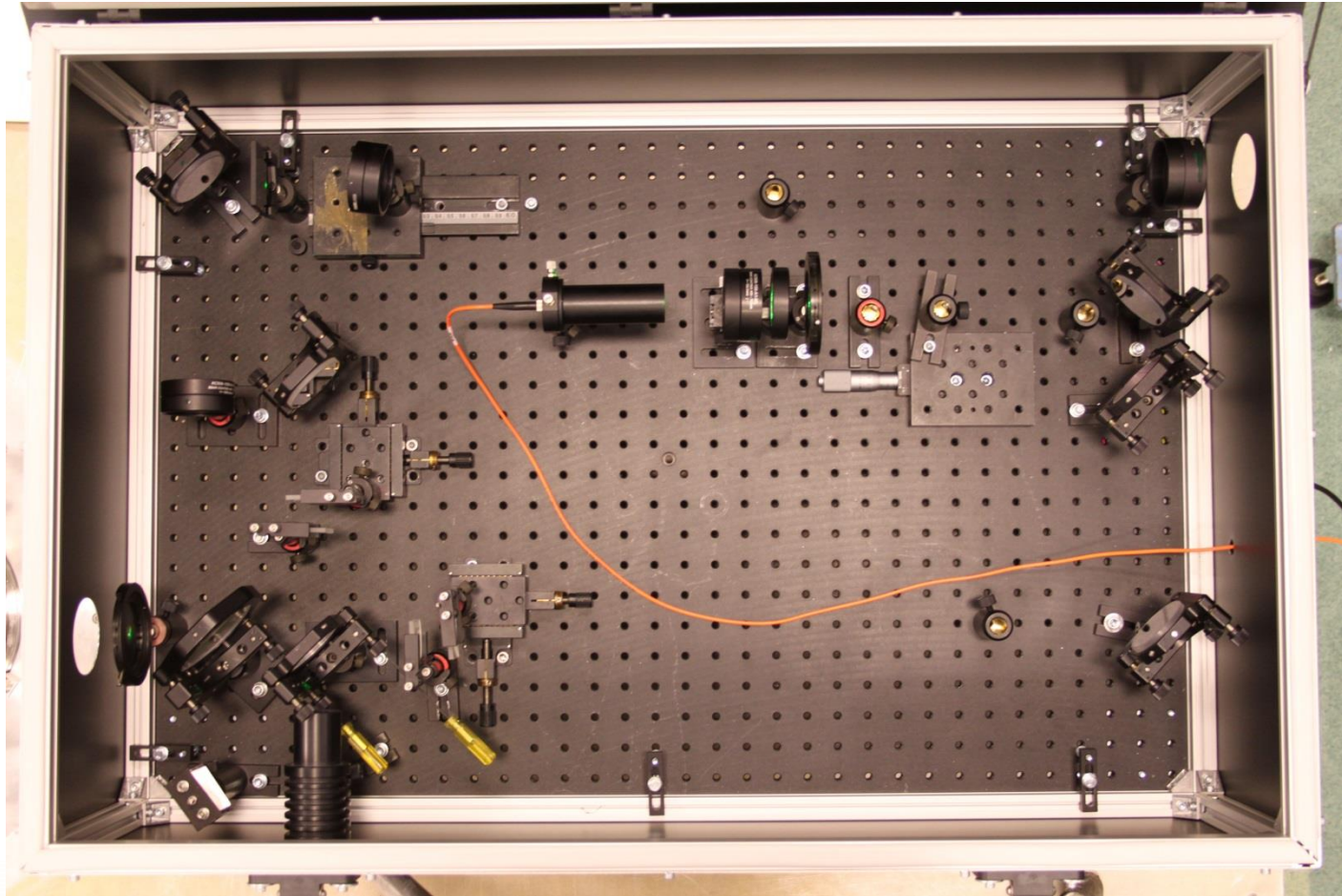
Laser
from
fibre

Optical Arrangement

- Laser
 - Shuttered
 - Multi-mode fibre
- X-hair formation
- Beam-splitter (BS1)
- Target

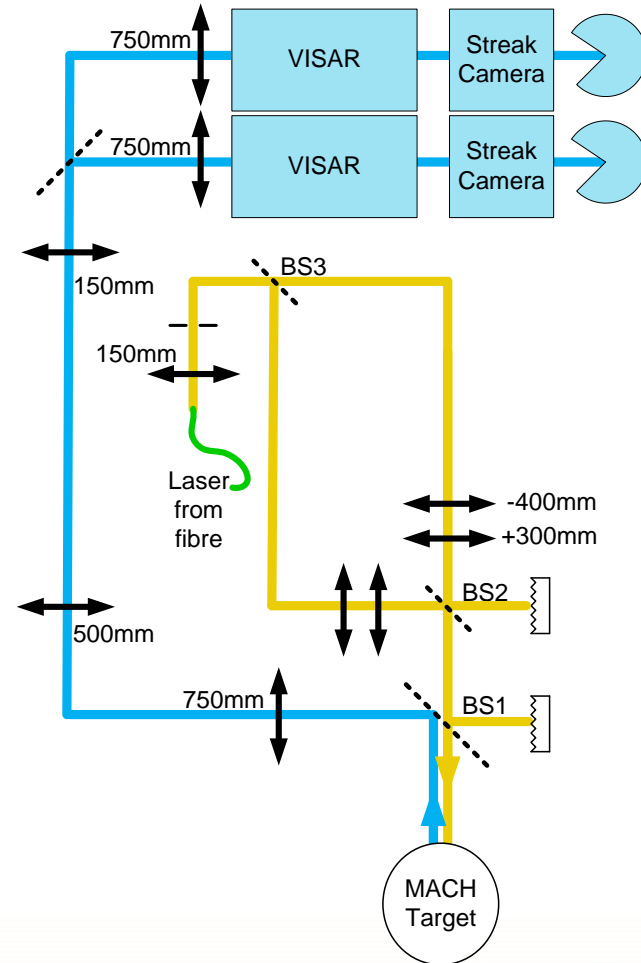


Optical Arrangement



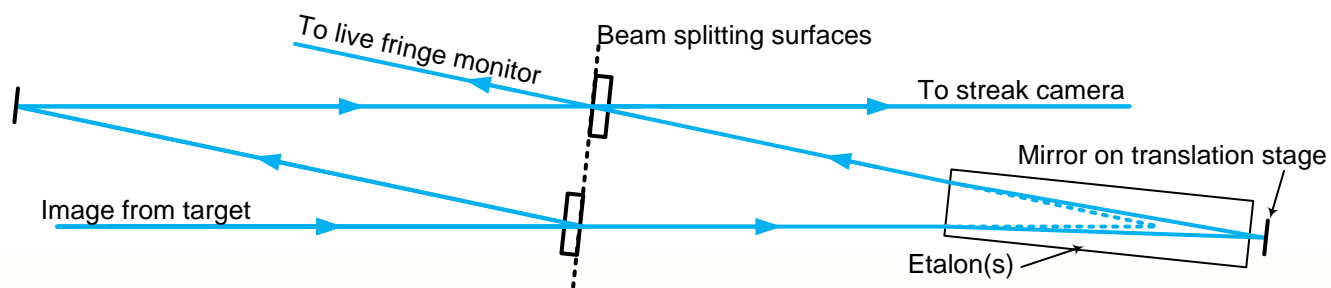
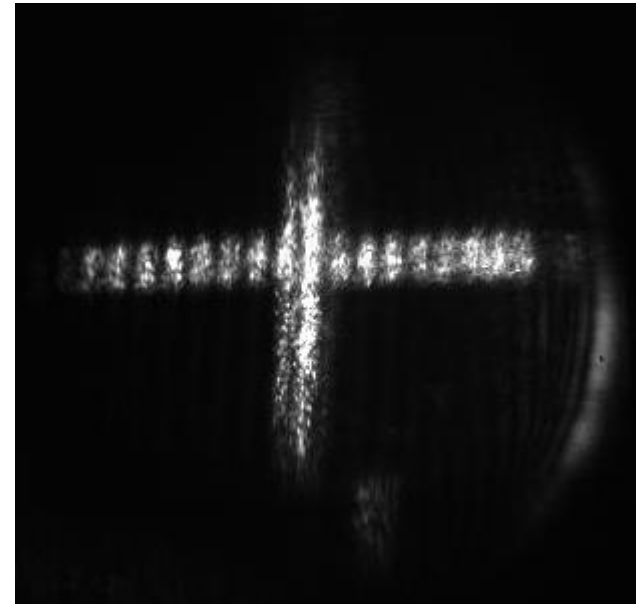
Optical Arrangement

- Laser
 - Shuttered
 - Multi-mode fibre
- X-hair formation
- Beam-splitter (BS1)
- Target
- Image relay
- **VISAR Interferometers**
- **Streak Cameras**
- **Canon DSLRs**



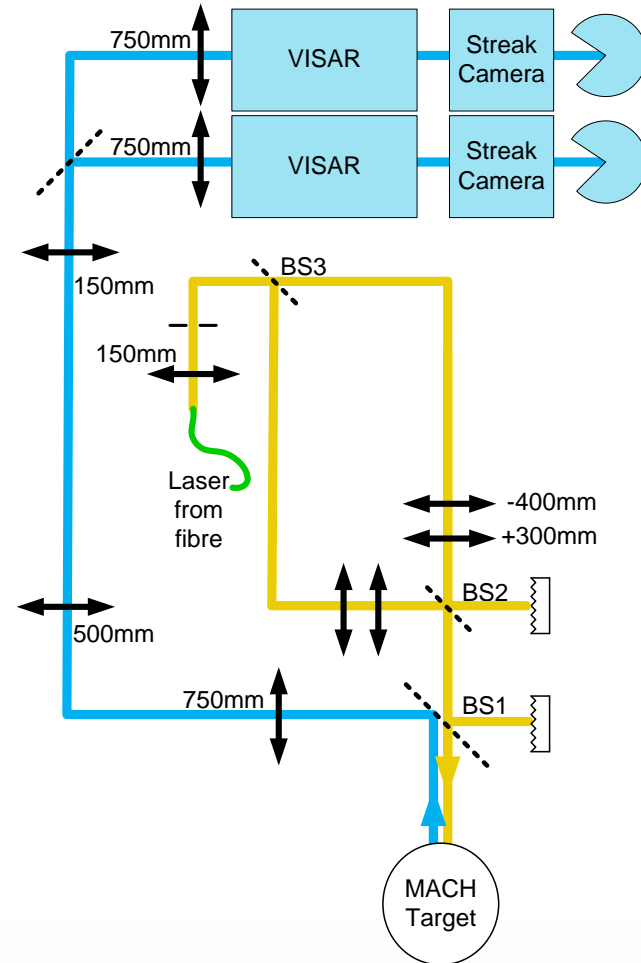
Interferometer

- Adjust contrast with Mirror on translation stage.
- Adjust fringes with output beam splitter



Optical Arrangement

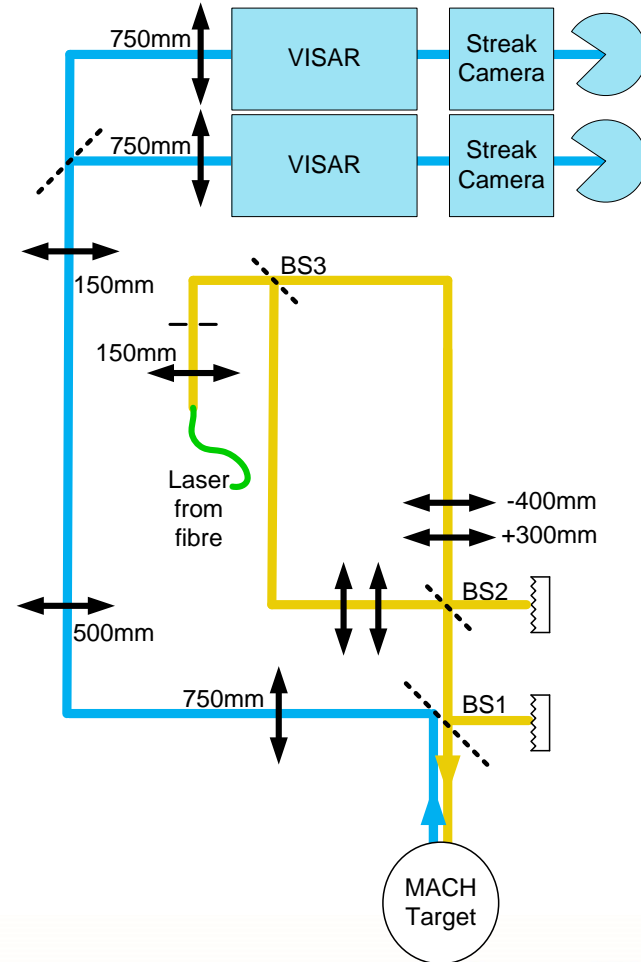
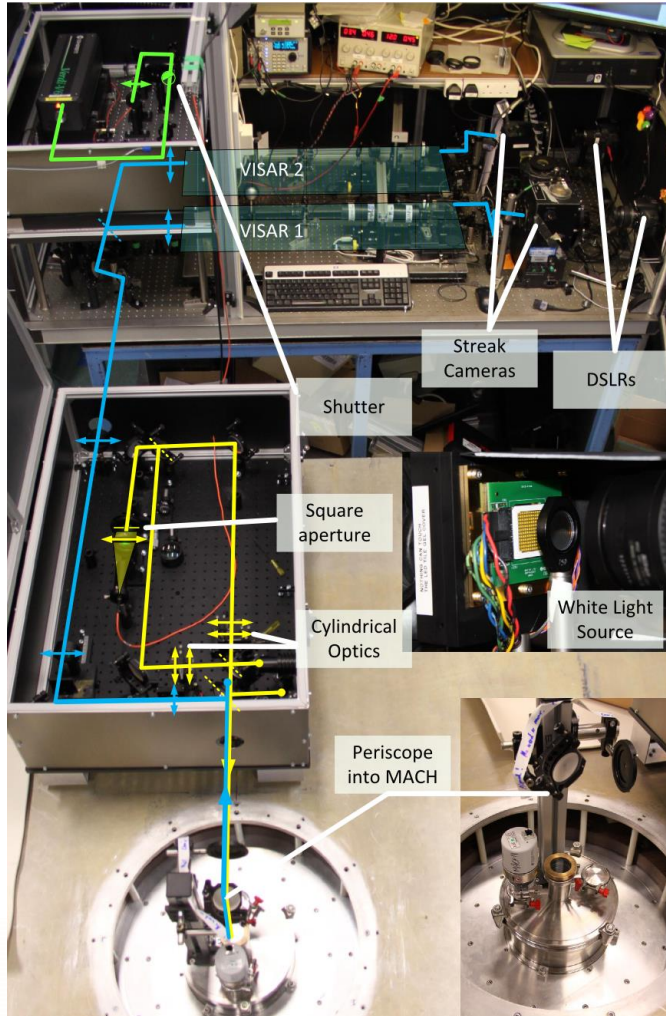
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Optical Arrangement

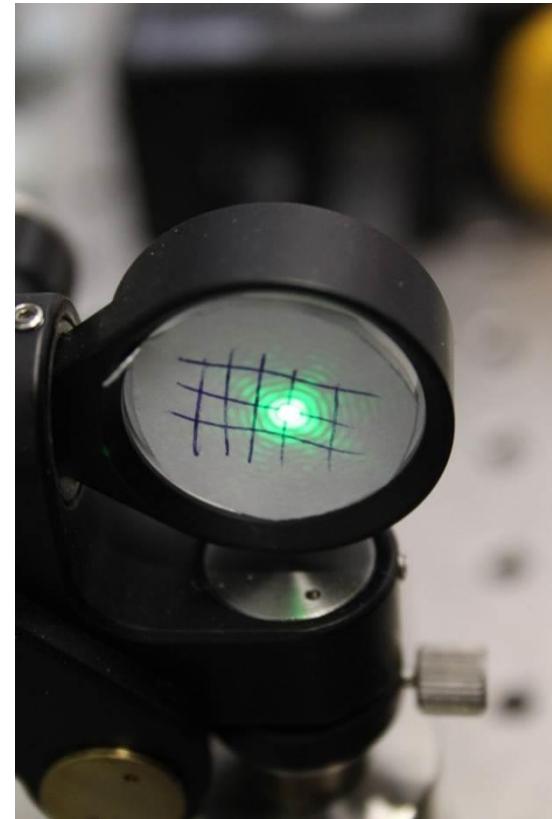
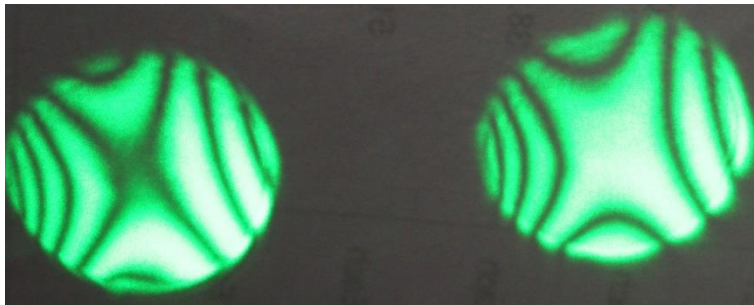


Optical Arrangement

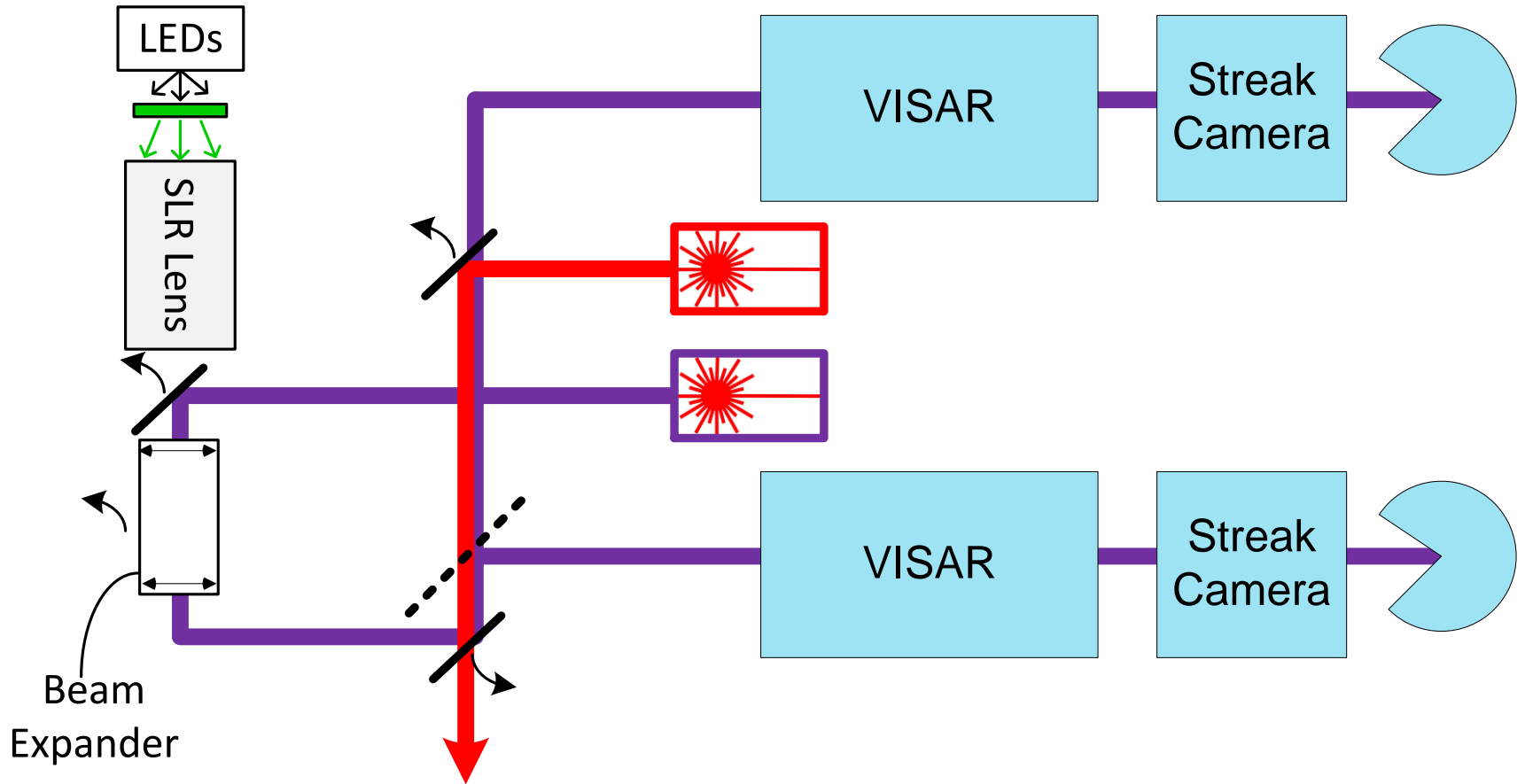


System Alignment

- Three alignment lasers (<5 mW):
 - Main beam replicator
 - Interferometer alignment
 - With beam expander
 - Counter propagating beam
- White Light LED tile & filters



System Alignment



White Light alignment

- White LED tile
 - 532 nm Line Filter (FWHM 1nm)
 - 532 nm line filter (FWHM 10nm)
 - 'White' light (no filters)
- SLR lens
 - Throw image & focus
- Diffuser
- Instability (up to 130 μ m range)

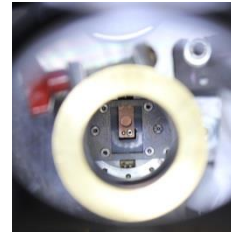
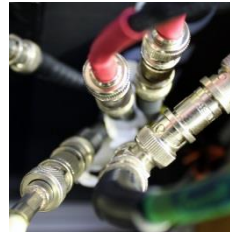


SUMMARY

Summary

- Not data presently
- ~£30,000 excluding laser and streak cameras.
 - Mostly 2" optics.
- Challenges
 - Anti reflection windows.
 - X-hair analysis.

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