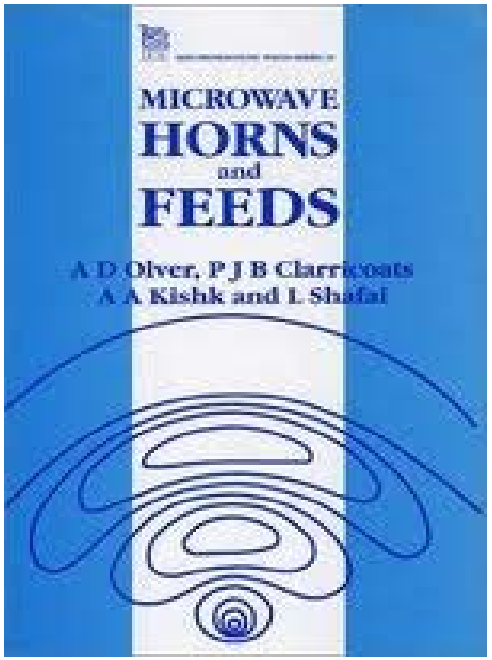
Queen Mary University of London

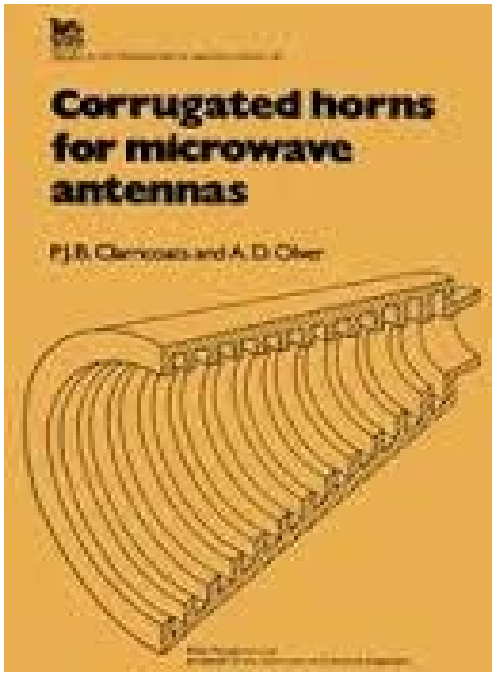
THz “Vision and Achievements”

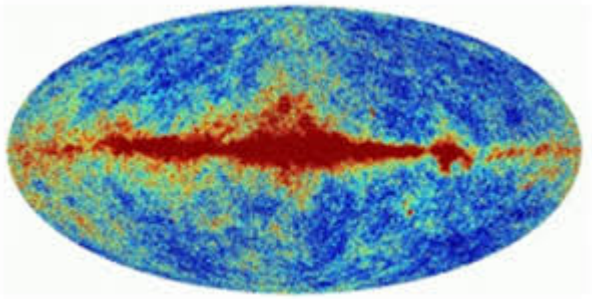
rob donnan: head of THz Group; Antennas & Electromagnetics Measurement Laboratory

https://antennas.eecs.qmul.ac.uk/

Prof. Peter Clarricoats, FRS - “Father of Theory Corrugated Feed Horns”



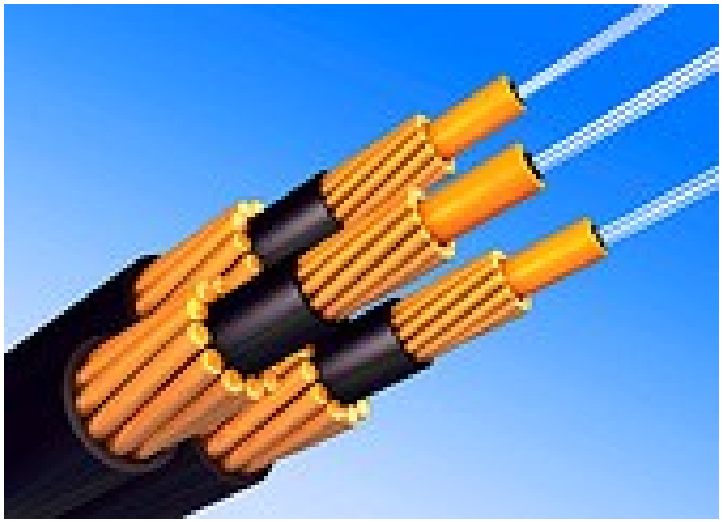




Charles Kuen Kao - “Father of Fiber-Optics”

The Nobel Prize in Physics 2009 was divided, one half awarded to Charles Kuen Kao *"for groundbreaking achievements concerning the transmission of light in fibers for optical communication"*, the other half jointly to Willard S. Boyle and George E. Smith *"for the invention of an imaging semiconductor circuit – the CCD sensor"*.

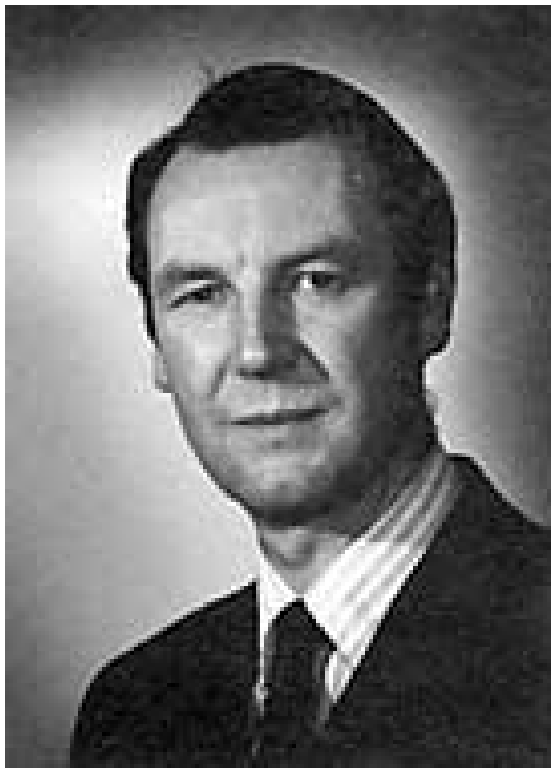
Antenna Group: PhD degree in electrical engineering from the Queen Mary College, University of London (1965)

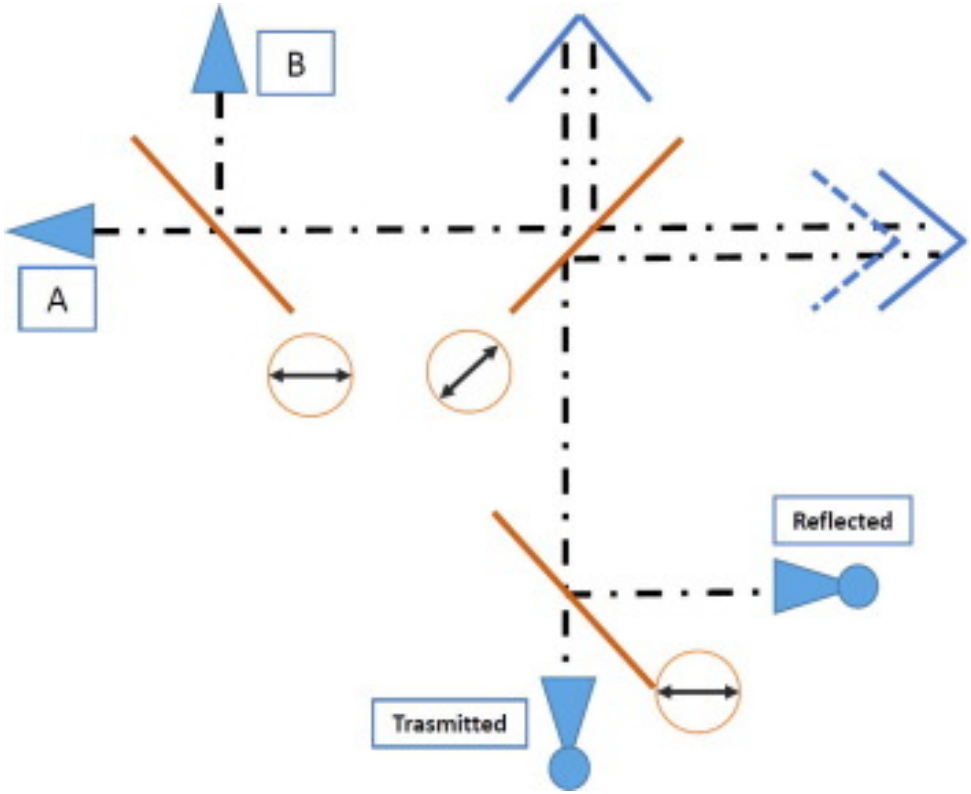


TERA K15
All fiber-coupled Terahertz Spectrometer

http://www.menlosystems.com

Prof. Derek Martin – UK pioneer in mm-wave physics & radiometry





Key contribution: ‘Martin-Puplett’ Polarisation Division Interferometer

Achievements

Birth of MRI: Professor Sir Peter Mansfield, FRS

Joint winner of the Nobel Prize for Medicine, October 2003.

Queen Mary College, University of London, BSc 1959, PhD 1962

Emeritus Professor of Physics, University of Nottingham

“QMUL Vision”

https://www.qmul.ac.uk/strategy/research/index.html

Antennas & Electromagnetics Measurement Laboratory “Mission”

"High Quality Research backed by High Quality Measurements"

Currently (12 academic staff, 8 postdocs, >40 PhD students)

THz Ambitions

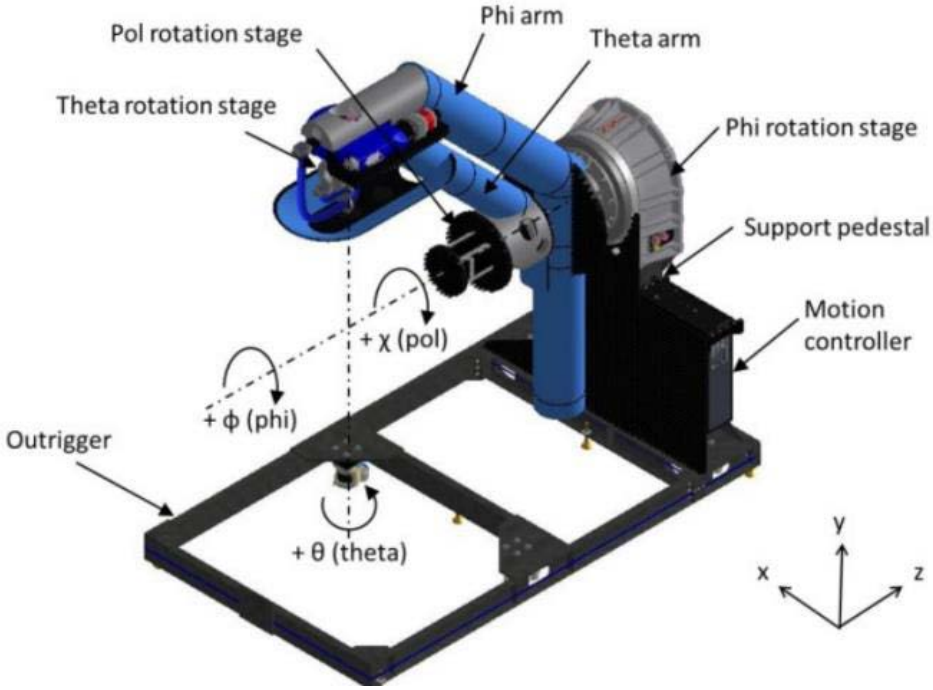
THz Antenna Fabrication and Measurement Facilities (TERRA)

- Integrated "digital" manufacturing and characterisation capability for a wide range of THz antennas and passive components, which, in turn, will accelerate the impact of our THz research and serve both S&T communities in the UK to align with the EPSRC priority area of "21st Century Products",
- Metamaterials and Manufacturing with reduced materials pallet.
- aim to achieve this by combining a state of the art millimetrewave spherical near-field antenna measurement system with a **state-of-the-art sub-micron resolution 3D printer to provide rapid prototype fabrication and test of antennas and devices up to 500GHz**

- £1.54M just awarded (August 2018 – 3 years), with the support of:

  Cambridge, Chester, Imperial College, Kent, Leeds, Liverpool, Manchester, Queen's Belfast, Reading, Sheffield, St Andrews, Surrey, UCL.

  Industrial users include NPL, RAL, QinetiQ, BAE Systems, Brody Forbes, Rosenberger, Thomas Keatings, Mediwise

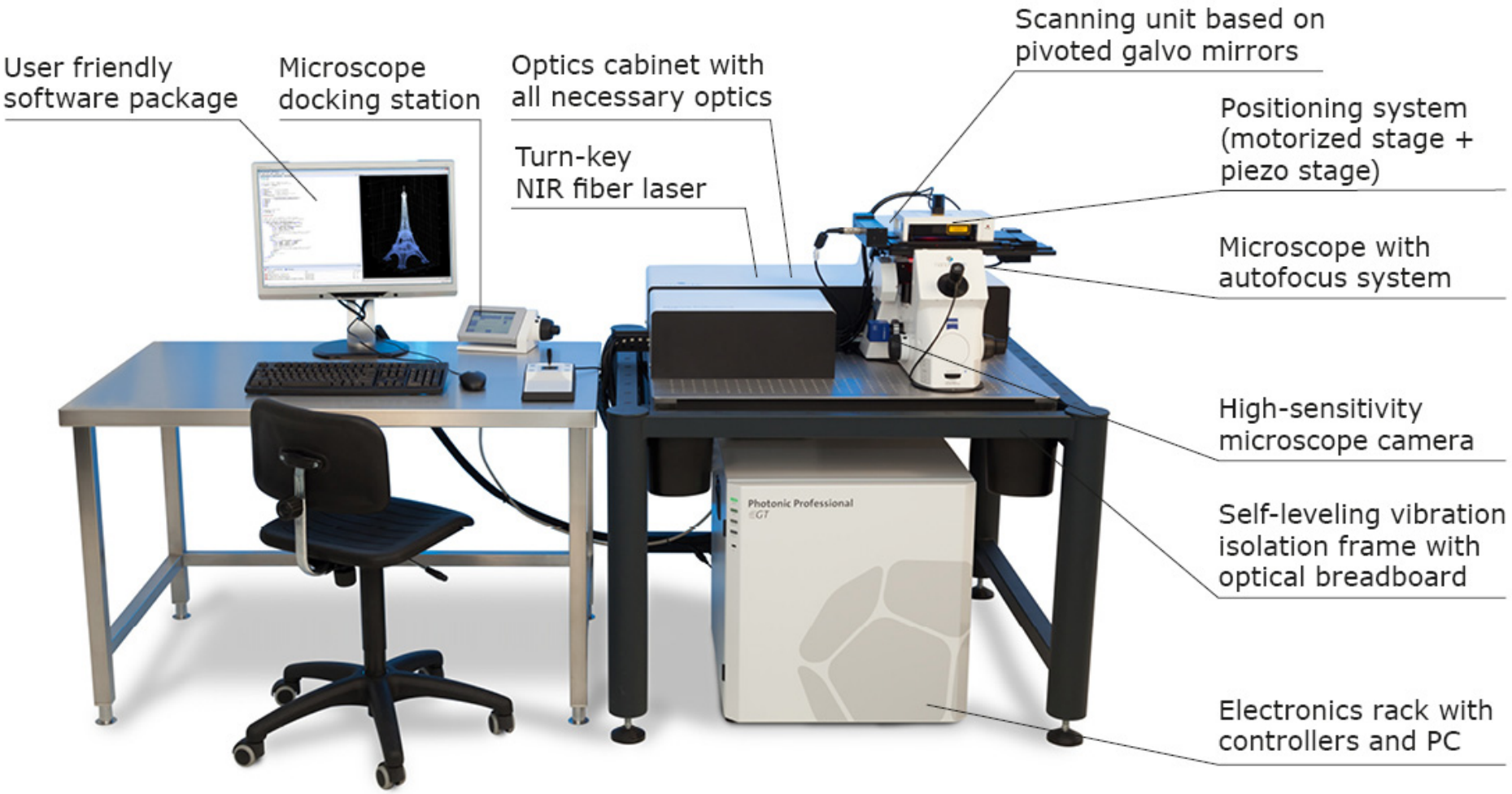


- The system will be the first of its kind in the UK and will serve to enhance our complementary range of microwave and THz measurement test facilities.

- Other THz measurement systems currently on the market only offer principal plane cuts for static AUT (Antenna Under Test) and for modern antennas this is completely inadequate.

Nano-scribe Photonic Professional GT 3D laser lithography system

https://www.nanoscribe.de/en/



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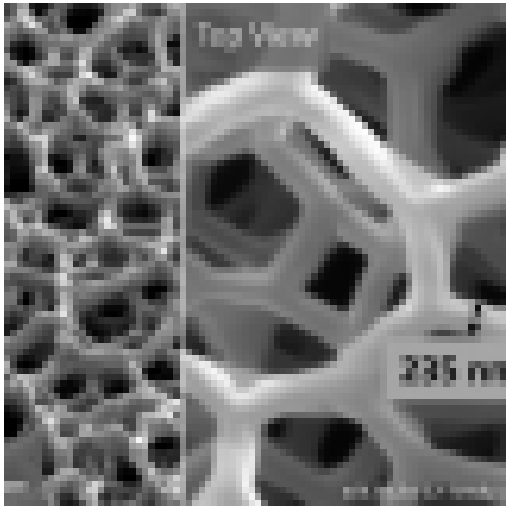
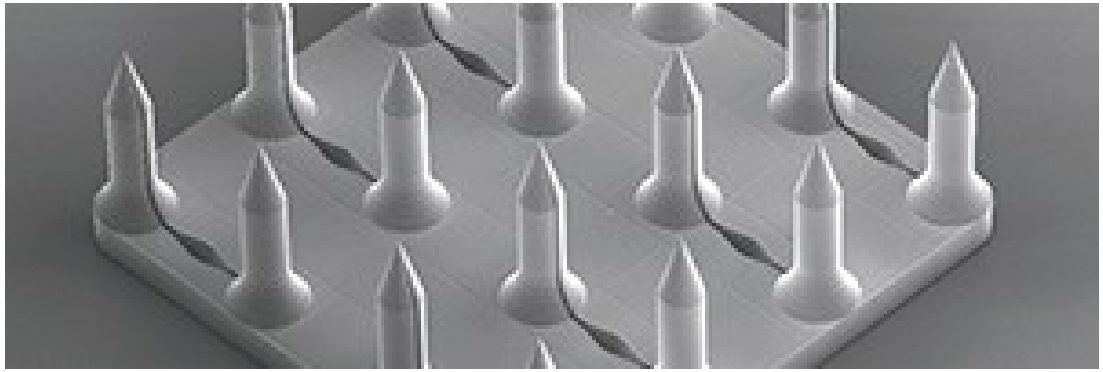
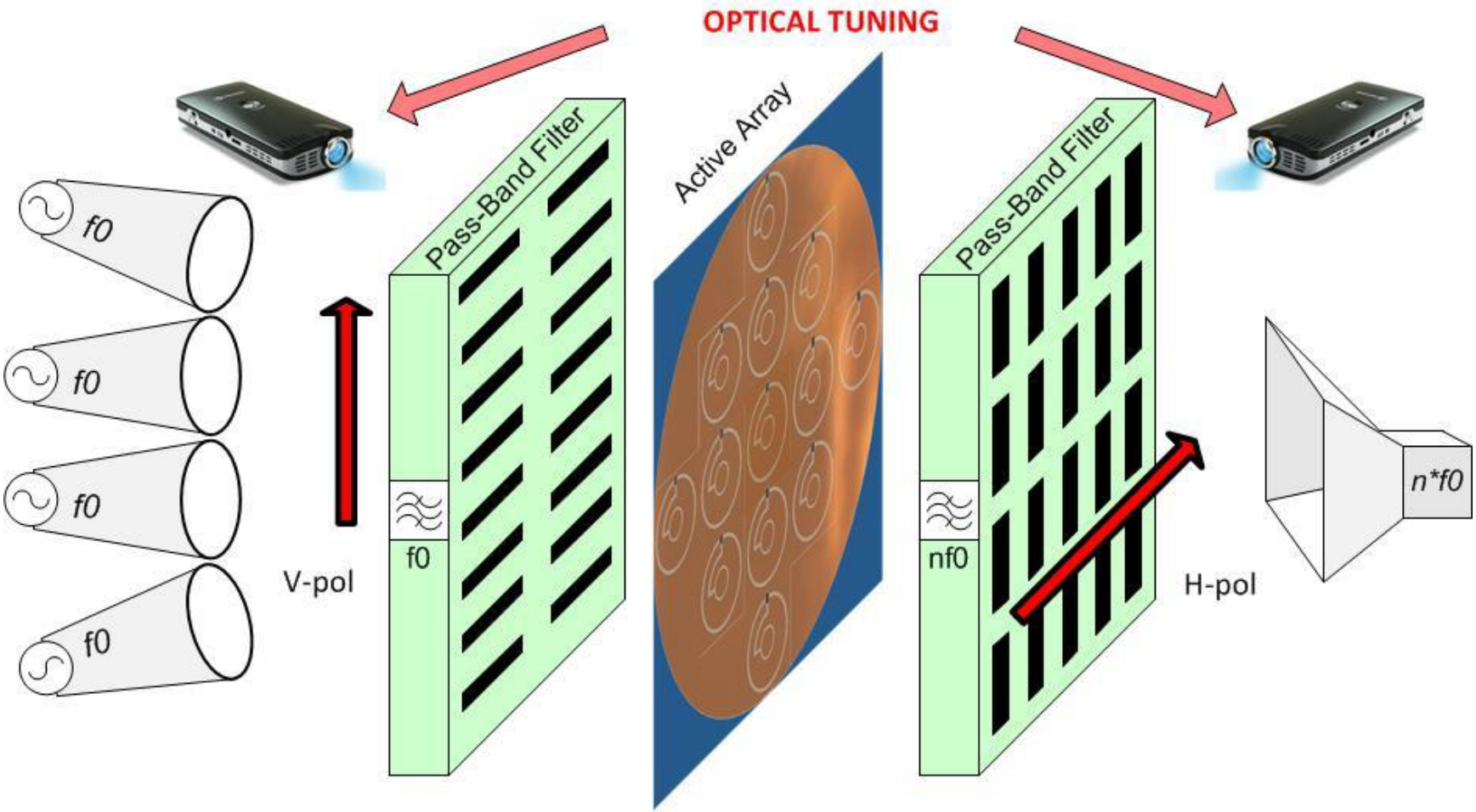




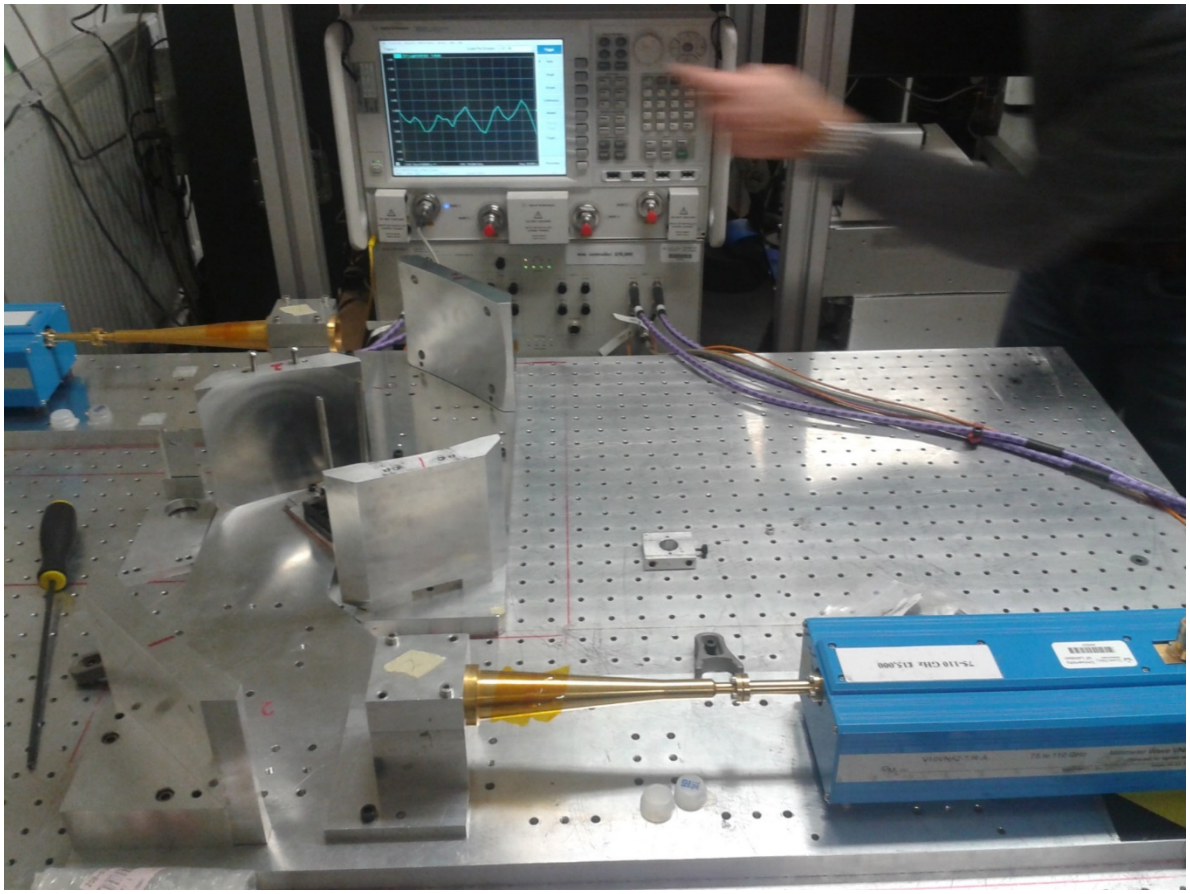
Other THz Ambitions

- ‘Multennas’ - Development of room-temperature, 100s mW, coherent, wideband sources



Other THz Ambitions

- Wideband, THz Circular Dichrosim Spectroscopy



- For direct spectroscopy of dissolved protein dynamics – water having no CD signature.