JAMES MITCHELL

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EDUCATION:

September 2015 - Present **Lancaster University (based at CERN)**

PhD RF Engineering:
Crab Cavity HOMs and Impedances.
Supervisors: Dr. Graeme Burt, Dr. Rama Calaga.

October 2012 - June 2015 **Lancaster University Engineering Department**

BEng Nuclear Engineering (First Class: 85%)
Comprised of: Electronic Engineering, Mechanical Engineering, Nuclear Engineering
BEng Project: *Radiotherapy Linac Design**.

*Project award medal received from the IMechE for most outstanding final year research, development or design project.

RESEARCH and EXPERIENCE:

PhD at CERN - Crab Cavity HOMs and Impedances

RF measurements and simulations - HOM couplers designed with FEA and equivanelt circuit modelling - Cavity measurements (room temperature, superconducting and with beam) - use of measurement statistics on new coupler design - couplers designed for manufacture - new and novel measurement and conditioning systems.

BEng Individual Research Project - Radiotherapy Linac Design

Radio Frequency (RF) $\pi/2$-mode standing wave annular coupled cavity - designed and optimised in several FEA codes - benchmarked against the current state of the art - prototype was designed in 3D CAD software with drawing sheets - manufacture with 5-axis CNC - bead-pull test stand, electronics, stepper motors and control software developed. The broad range of engineering disciplines used won the IMECHE's project award in 2015.

Team Project - Robot Project (Team leader and motor specialist)

Multi-disciplinary engineering project: A robot was designed and built to follow a pre-defined path, pick up and carry an object to a defined destination. Time and resource management skills were imperative and the team was awarded second place in the final timed trials.

Publications and Invited Talks

Conference proceedings (11), journal papers (5) and invited talks (6) are available at my website.

Roles of Responsibility

Professional: CEPC International Review Commity for HOM couplers, CERN summer student supervisor.
Outreach: Mathematics tutor (GCSE), high school and college seminars for students interested in futures in science.

TRAINING:

Schools and Conferences

Cockcroft Institute Lecture Courses†, Cockcroft Institute Particle Accelerator School, HOMSC*, HiLumi'16*, SRF'17*, HiLumi'18*, IPAC'18*.

†Second highest assessment score, *oral or poster presentation.

Technical training

Research methods, STFC HSE (Health, Safety and Environment), Radiation Test Facility, Cryogenics Safety, Project Management, LaTeX, MADX, CATIA and SmarTeam, Self-Rescue Mask, Radiation, LabVIEW Core 1.

TECHNICAL PROFFICIENCIES:

Operating systems:	LINUX, Mac OS X and MS Windows.
Programming languages:	PYTHON, MatLAB.
Software packages:	CST MWS, SolidWorks, CATIA, SmarTeam, Microwave Office AWR, LTSpice, MS Office, LaTeX.
RF Measurements:	Vector network analysers, spectrum analysers, oscilloscopes, power meters, signal generators, calibration measurements.
Other measurements:	Digital and analogue electronics, PCB design, motors (ac, dc, stepper).

PUBLICATIONS:

Conference[‡]

- J. Mitchell et al., *"LHC crab cavity coupler test boxes"*, IPAC 2016, Busan, Korea.
- J. Mitchell et al., *"HOM coupler alterations for the LHC DQW Crab Cavity"*, SRF 2017, Lanzhou, China.
- J. Mitchell et al., *"Simulation and measurements ofcrab cavity HOMs and HOM couplers for HL-LHC"*, SRF 2017, Lanzhou, China.
- J. Mitchell et al., *"DQW HOM coupler design for the LHC"*, IPAC 2018, Vancouver, Canada.

[‡]Only first authored included.

Journal

- A. Caldwell, et al., *"Path to AWAKE: Evolution of a concept"*, NIMA, Nov. 2015.
- E. Gschwendtner, et al., *"AWAKE, The Advanced Proton Driven Plasma Wakefield Acceleration Experiment at CERN"*, NIMA, Dec. 2015.
- P. Muggli, et al., *"AWAKE readiness for the study of the seeded self-modulation of a 400 GeV proton bunch"*, PRL, Aug. 2017.
- A. Caldwell, et al., *"The electron accelerators for the AWAKE experiment at CERN - Baseline and Future Developments"*, NIMA, Nov. 2017.
- E. Aldi, et al., *"Acceleration of electrons in the plasma wakefield of a proton bunch"*, Nature, August. 2018.

In Work

- J. Mitchell, et al., *"Higher Order Mode Filter for the Double Quarter Wave Crab Cavity for the LHC High Luminosity Upgrade"*.

PRESENTATIONS: INVITED AND CONFERENCE

- *Pre-Installation Spectral Response Analysis of the HiLumi Crab Cavity HOM Couplers*, HOMSC, Rostock, Aug. 2016.
  Also given as *B2FiftyTwo Seminar* at CERN.
- *Warm Measurements on Cavities/HOMs*, 6th HL-LHC Collabotation Meeting, Paris, Nov. 2016.
- *First Test Results of DQW HOM Coupler Testing (and Design for LHC)*, Joint LARP CM28/HiLumi Meeting, CA, USA, Apr. 2017.
- *DQW HOM Coupler for LHC"*, HL-LHC-UK'17, University of Huddersfield, July. 2017.
- *DQW HOM Measurements*, 7th HL-LHC Collabotation Meeting, Madrid, Nov. 2017.
- *Designing HOM couplers for Manufacture*, IET-STFC RF-Mechanical Workshop, Warrington, UK, Sept. 2018.

Future

- *DQW HOM Update*, 8th HL-LHC Collabotation Meeting, CERN, Oct. 2018.
- *SPS DQW HOM Measurements and Impedance*, 8th HL-LHC Collabotation Meeting, CERN, Oct. 2018.