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Dr Frederick Huang

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About

Dr Huang is a member of the EDT group, with research interests in microwave filters including high-temperature superconducting filters and suppression of filter harmonics. He has 90 research publications in surface acoustic waves, signal processing, and microwaves. He was co-investigator in a multi-million pound EPSRC portfolio award (HTS : Fundamental Science to Applications) together with other EPSRC and EU awards.

He is also year tutor for the Electrical Engineering Foundation year, and lectures in electric field theory and analogue signal processing.

Qualifications

- CEng 1989
- DPhil 1984
- BA 1980

Biography

Frederick Huang received a B.A. and D. Phil in Engineering Science from the University of Oxford in 1980 and 1984 respectively. He has worked in at Racal Research Ltd. and at Thorn-EMI Central Research Laboratories. Since 1989 he has been a lecturer with the University of Birmingham.

Previous research interests are surface acoustic wave (SAW) dot array pulse compressors, analogue voice scramblers, Langmuir-Blodgett films in SAW devices, SAW and superconducting linear phase and chirp filter synthesis using inverse scattering, slow-wave structures, superconducting quasi-lumped element filters, switched filters and delay lines, together with microstrip and waveguide discontinuities. A recent major research area is spiral band-pass filters, mainly superconducting filters. This has lead to collaboration with the Jodrell Bank radio telescope and the Sardinia radio telescope, which benefit from increased telescope performance using superconducting filters. The most recent research area is in the suppression of harmonic responses in microwave filters.

Dr Huang's research over the years has led to three patents and patent applications. He is a member of the IET (UK). He is reviewer for various academic journals.

Teaching

- Analogue signal analysis and signal processing (3rd yr)
- Foundation Electrical and Electronic Engineering

Postgraduate supervision

In addition to the research described in the biography, Dr. Huang also supervises PhD students in

- Antennas and
- Waveguide components

Research

Research Highlights:

A recent major research area is spiral band-pass filters, mainly superconducting. These are not simply old designs from existing copper filters transferred to a new medium, but new architectures specially created to take advantage of the low superconductor losses, creating very compact and low-loss designs. Some of these designs were used by in the Jodrell Bank radio astronomy receivers, including one specially designed in the attempt to receive signals from the Beagle II Mars probe. Work for the Sardinia radio telescope continues.

The most recent research area is in the suppression of harmonic responses in microwave filters. This was originally for the radio telescope receivers but has been extended to copper filters for a wider range of applications.

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8. F. Huang, “Thin-Film HTS Delay-Line Filters”, (invited review paper),
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9. H.T. Su, M.J. Lancaster, F. Huang, “Electrically tunable superconducting lumped element resonator using thin film ferroelectrics”,
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10. H.T. Su, F. Huang, and M.J. Lancaster, “Highly Miniature HTS Microwave Filters”,
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12. Jiafeng Zhou, Michael J Lancaster and Frederick Huang, “Coplanar quarter-wavelength quasi-elliptic filters without bond-wire bridges”,
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14. Hieng Tiong Su, Yi Wang, Frederick Huang, and M J Lancaster, "Wideband Superconducting Microstrip Delay line,"
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