

# MILLIMETRE WAVES: VISION FOR THE FUTURE



AN OUTREACH PROGRAMME FROM THE UNIVERSITY OF ST ANDREWS

## THE WORKSHOP

"Millimetre Waves: Vision for the Future" is an outreach programme from the University of St Andrews, in conjunction with FifeX Ltd., which aims to explain what millimetre waves are, what they can do, and in particular why they offer an advantageous method of imaging.

We offer a schools Workshop which is designed to run for approximately 50 minutes and provides an introduction to what millimetre waves are, why they are useful and what they can be used for in the real world.

The structure of the Workshop is in three parts:-

1. Introductory talk
2. Interactive hands-on sessions
3. Concluding talk

In **Part 1**, Workshop visitors will be introduced to some of the key scientific concepts, such as the electromagnetic spectrum and the wave nature of light, and will be introduced to some millimetre wave imaging applications.

In **Part 2**, the audience splits into groups for the interactive hands-on sessions. The structure of this is flexible and groups will get a chance to visit one, some, or all of the interactive sessions depending on numbers, ability and how much time is available. Usually, we offer the following four key areas:

**"Seeing Through Stuff"** – Investigate how different wavelengths pass through various materials in different ways, illustrated with a comparison between visible, infrared and millimetre waves. Millimetre waves can see through many opaque materials.

**"Picture Perfect?"** – What is 'resolution' and how does it affect imaging? Explore the relationship between wavelength and resolution. What are the key factors that influence whether an object can be detected, recognised or identified?

**"Cops and Doppler"** – Learn about the Doppler Effect and how it works. Hands-on demonstration of Doppler speed sensors. Understand how the Doppler Effect is used in Police radar speed guns.

**"SAFIRE"** – is a custom built mm-wave radar developed specially for this Workshop. It allows visitors to see a real-time radar map of the room and identify themselves and other objects in the image. The internals of the radar are visible

In **Part 3**, they will be brought back for the final talk which will review and consolidate all these ideas before finishing with a look at some cutting edge applications of millimetre waves in the real world, including:

- A volcano imager – for looking at lava domes through cloud, gas and dust
- Security imaging – using mm-wave imagers to see weapons hidden beneath clothing
- Autonomous Landing Guidance – for landing planes in the fog

Teachers will be provided with materials that they can use to continue some of the ideas in the classroom. The project website contains much of the Workshop information and links to other relevant websites.

For further details and booking enquiries contact the team at:-

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