INSERT POSTER TITLE

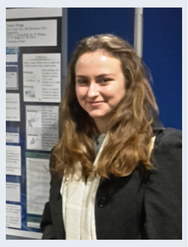
Author hw454@bath.ac.uk
Supervisors:
Co-SuperVisors,
Supervisors
University

Change these logos.

Who are we? CHANGE THIS TO THE TITLE OF YOUR FIRST COLLUMN.

PhD Student BLOCK TITLE

BLOCK TEXT **H. Wragg**
SAMBa aligned PhD student at the University of Bath.



Supervisors BLOCK TITLE

BLOCK TEXT **Primary Supervisor:**
C. Budd
Professor of Applied Mathematics at the University of Bath and Professor of Mathematics at the Royal Institution of Great Britain.

Secondary Supervisor:
R. Watson
Senior Lecturer in the department of Electronic and Electrical Engineering at the University of Bath.

Industrial Supervisors BLOCK TITLE

BLOCK TEXT **K. Briggs**
A research mathematician, for BT TSO at Adastral Park.

M. Fitch
A research engineer for BT TSO at Adastral Park.

Where? TITLE

Adastral Park BLOCK TITLE

BLOCK TEXT Adastral Park is home to the

The Project

AIM BLOCK TITLE

BLOCK TEXT

- **Create an accurate model and reduce the time it takes to simulate indoor-to-indoor WiFi propagation in a domestic environment.**
- **Use the model to optimize the location of low powered base stations.**

Proposed method BLOCK TITLE

BLOCK TEXT

- Use intelligent algorithms and adaptive mesh techniques to decrease execution time.
- Compare simulation results to PDE models and to measured results from BT.
- Develop a stochastic model for the environment.
- Optimize the location of the transmitter using the developed model.

High frequency BLOCK TITLE

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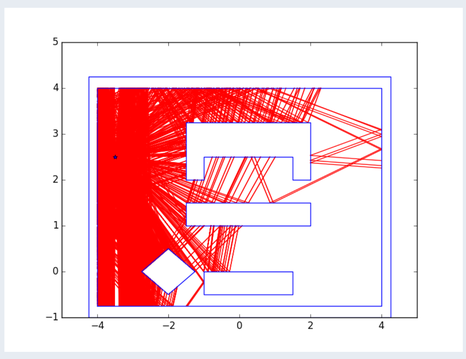


Figure: The rays propagating from the transmitter.

- The signal strength can be calculated along the trajectory of the ray.
- This takes into account the loss from the distance travelled, and from the interactions with the furniture.

BLOCK TEXT

- Since the waves we are looking at are at a high frequency (typically of the order of 3GHz, but sometimes going higher) we can model them using ray-tracing.
- This is very computationally costly to run and requires lots of input information.

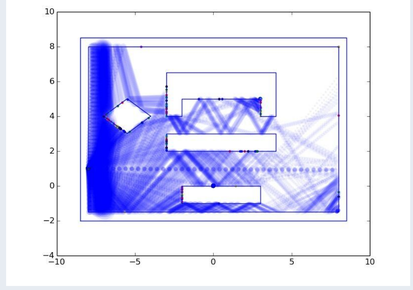
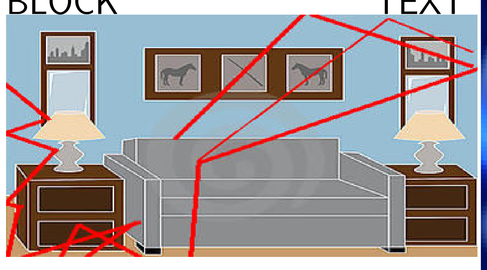


Figure: The signal strength along the ray trajectories.

Domestic environment BLOCK TITLE

BLOCK TEXT



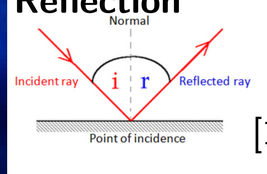
BLOCK TEXT

- A domestic environment is very cluttered, which reduces the number of line-of-sight paths.
- Each collision results in the wave having a combination of reflections, diffractions, and refractions.

Collisions BLOCK TITLE

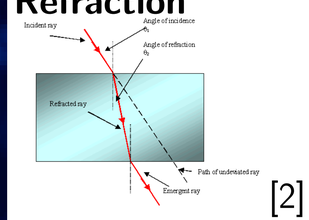
BLOCK TEXT Colliding with an object causes a loss in the signal power.

Reflection



[1]

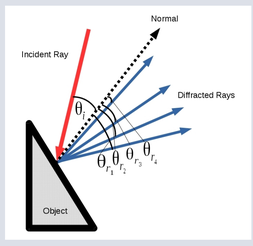
Refraction



[2]

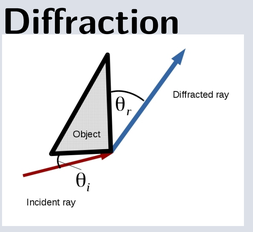
BLOCK TEXT After colliding with an object at some angle of incidence i, a ray is then reflected at an angle of reflection r. BLOCK TEXT When a ray travels through an object, it is refracted slightly towards the normal.

Scattering



BLOCK TEXT When colliding with a rough surface, a ray can scatter. This can be unpredictable, and can be computationally costly to simulate. [3]

Diffraction



BLOCK TEXT Collision with the corner of an object causes the ray to diffract, which is also difficult to predict.

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