TEACHING ABOUT RADIO USING AN ON-LINE VIRTUAL ENVIRONMENT

TROVE

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What is TROVE

- **It is an alpha version implemented in a virtual educational land**

- **Aims to teach students about radio signals and how they interact with the surrounding environment.**

- **Improves the learning experience of the physics and computer science students studying electromagnetic wireless systems**
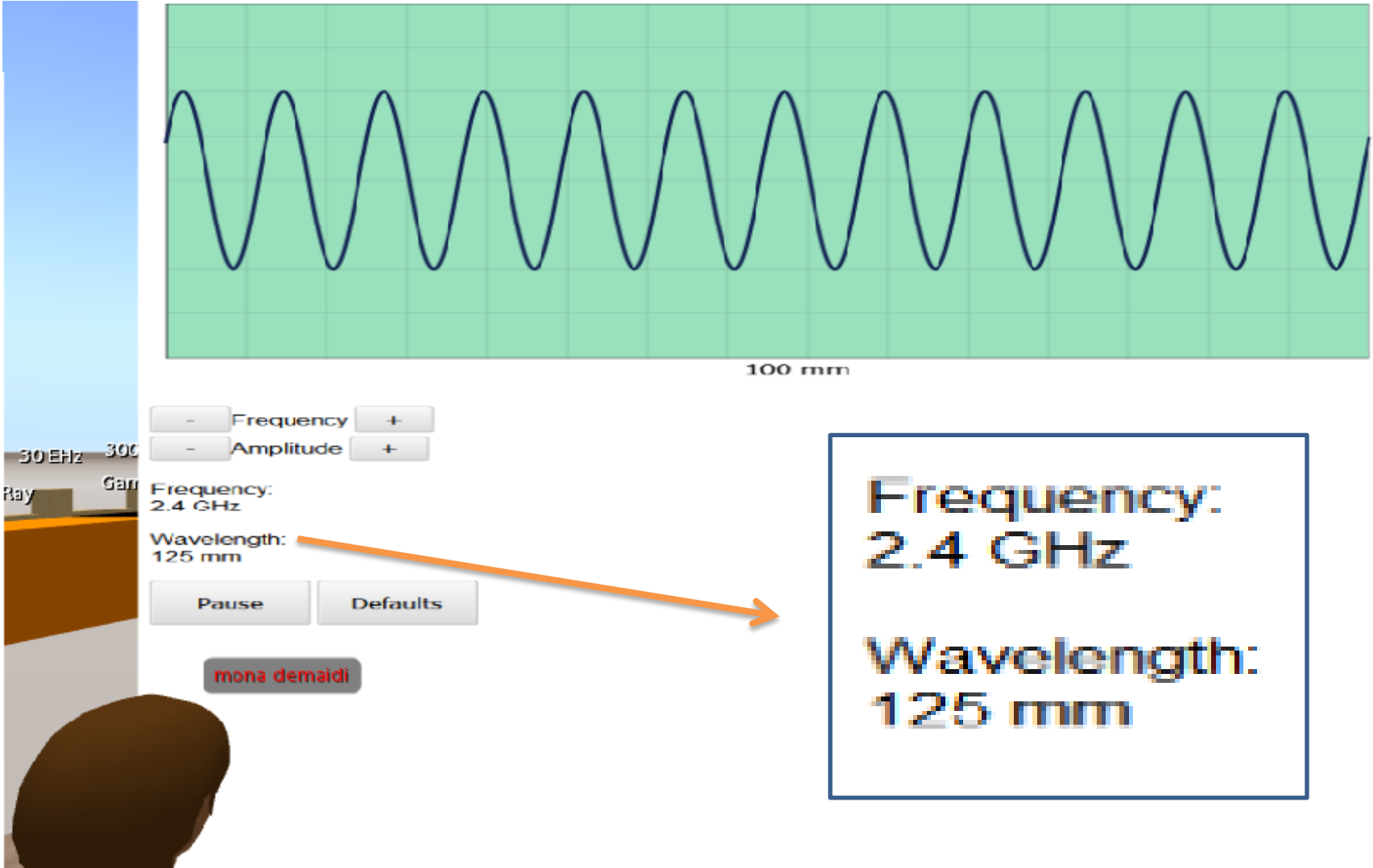
- **Contains several educational tools**

Why TROVE

- **Wireless signals are transparent**

- **Students face problem understanding how signals propagate and how they are affected by the surrounding environment.**

- **Provides students with an educational land where concepts related to waves, frequency ,wavelength, free space propagation and ray tracing are introduced.**

- **Allows Students to visualize signal behaviour (reflection and refraction) in a three dimensional world**
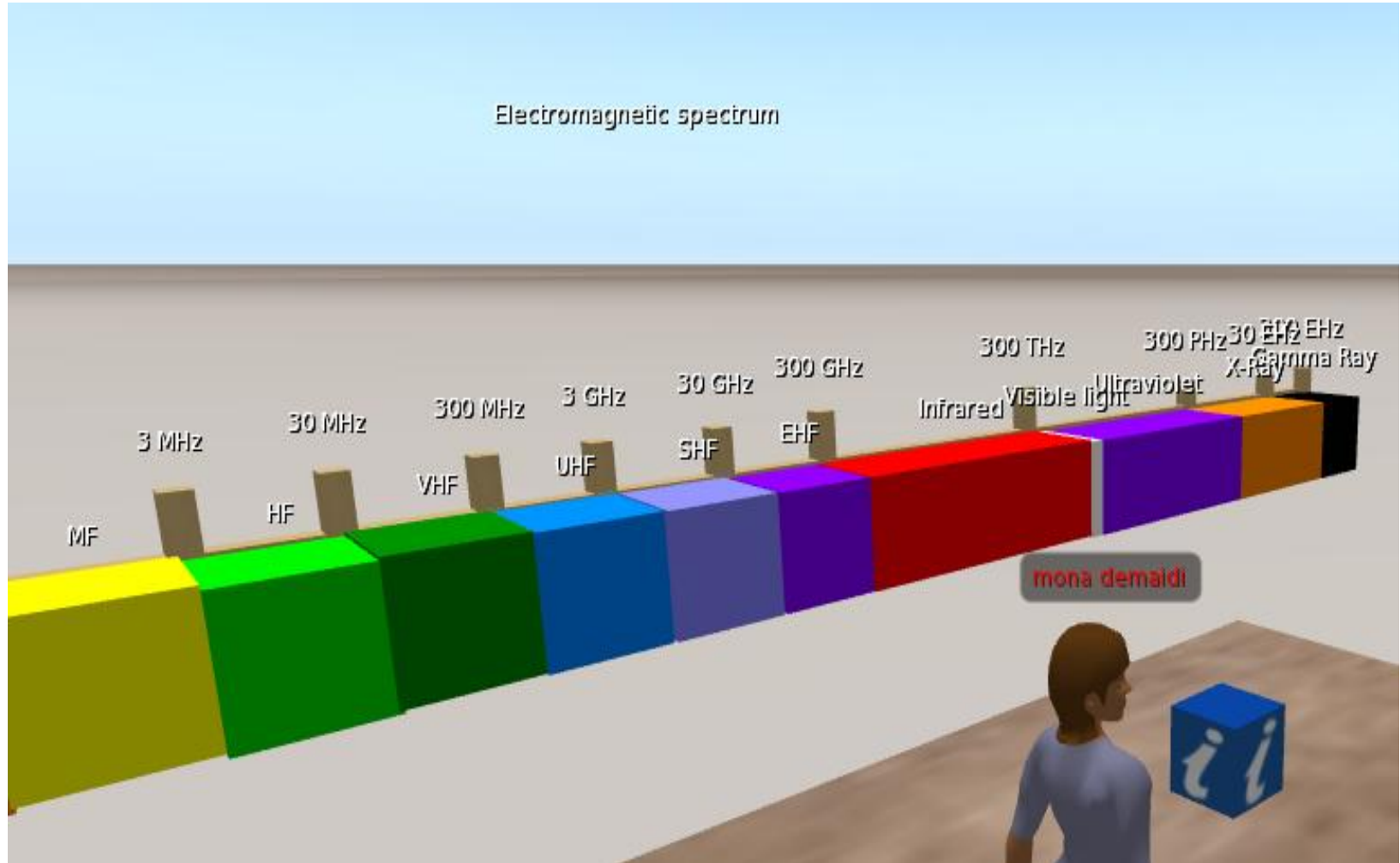
TROVE tools

- **The frequency- wavelength tool**

- **The electromagnetic spectrum tool**

- **The antenna tool**

- **Bracelet remote control**

- **Free space propagation laboratory**

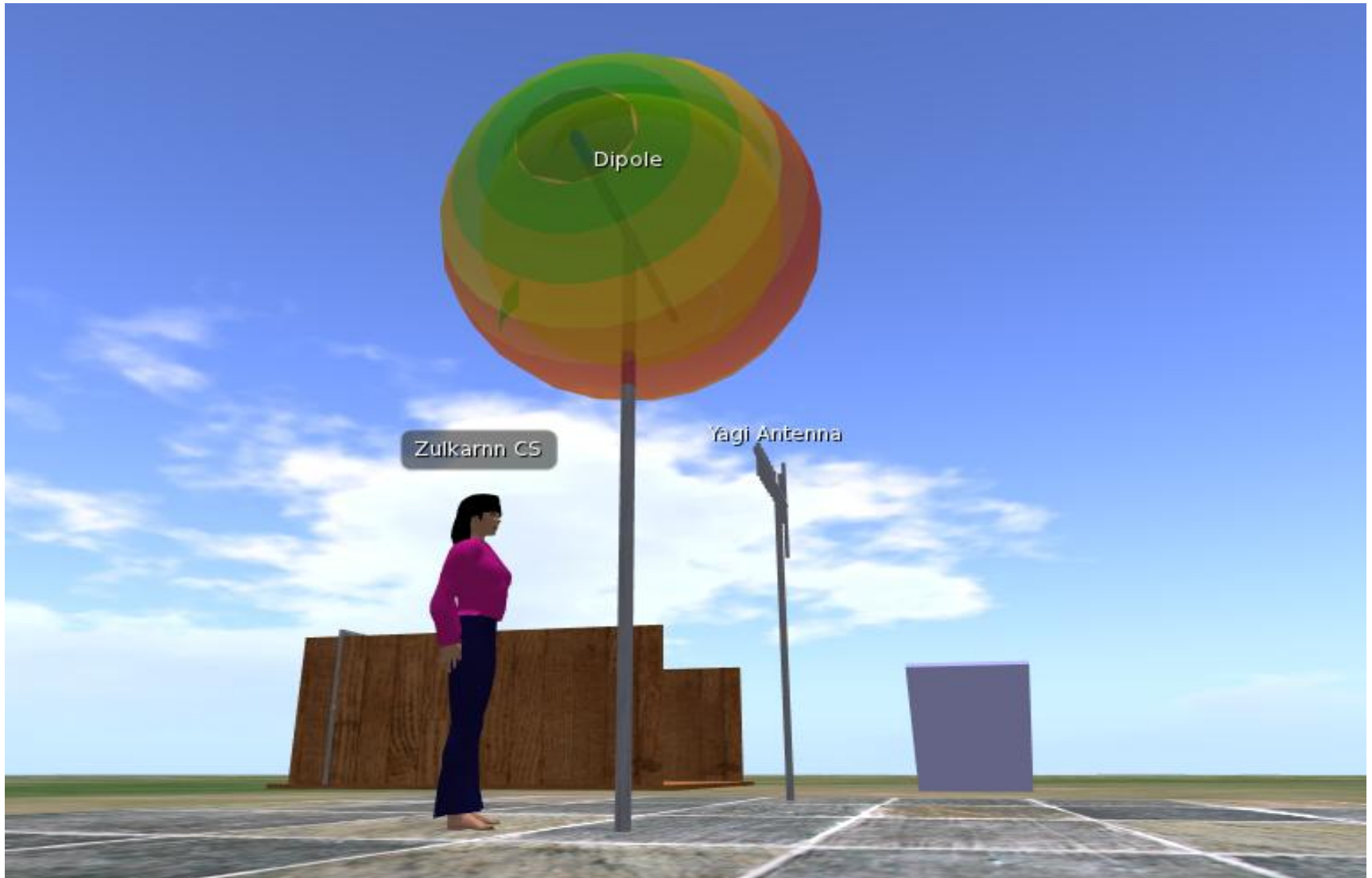- **The wireless ray tracing laboratory**

Frequency-wavelength converter tool

100 mm

- Frequency +
- Amplitude +

30 EHz   300

Ray   Gan

Frequency:
2.4 GHz

Wavelength:
125 mm

Pause   Defaults

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Frequency:
2.4 GHz

Wavelength:
125 mm

Electromagnetic spectrum tool

Antenna tool

Remote Control

You could use me to control your free space propgation labroutary and 2D/3D wireless ray tracing labroutary !!!
Draw Rays:

- 0-Reflection
- 1-Reflection
- 2-Reflections
- 3-Reflections
- 4-Reflections
- 5-Reflections
- All Rays

Draw

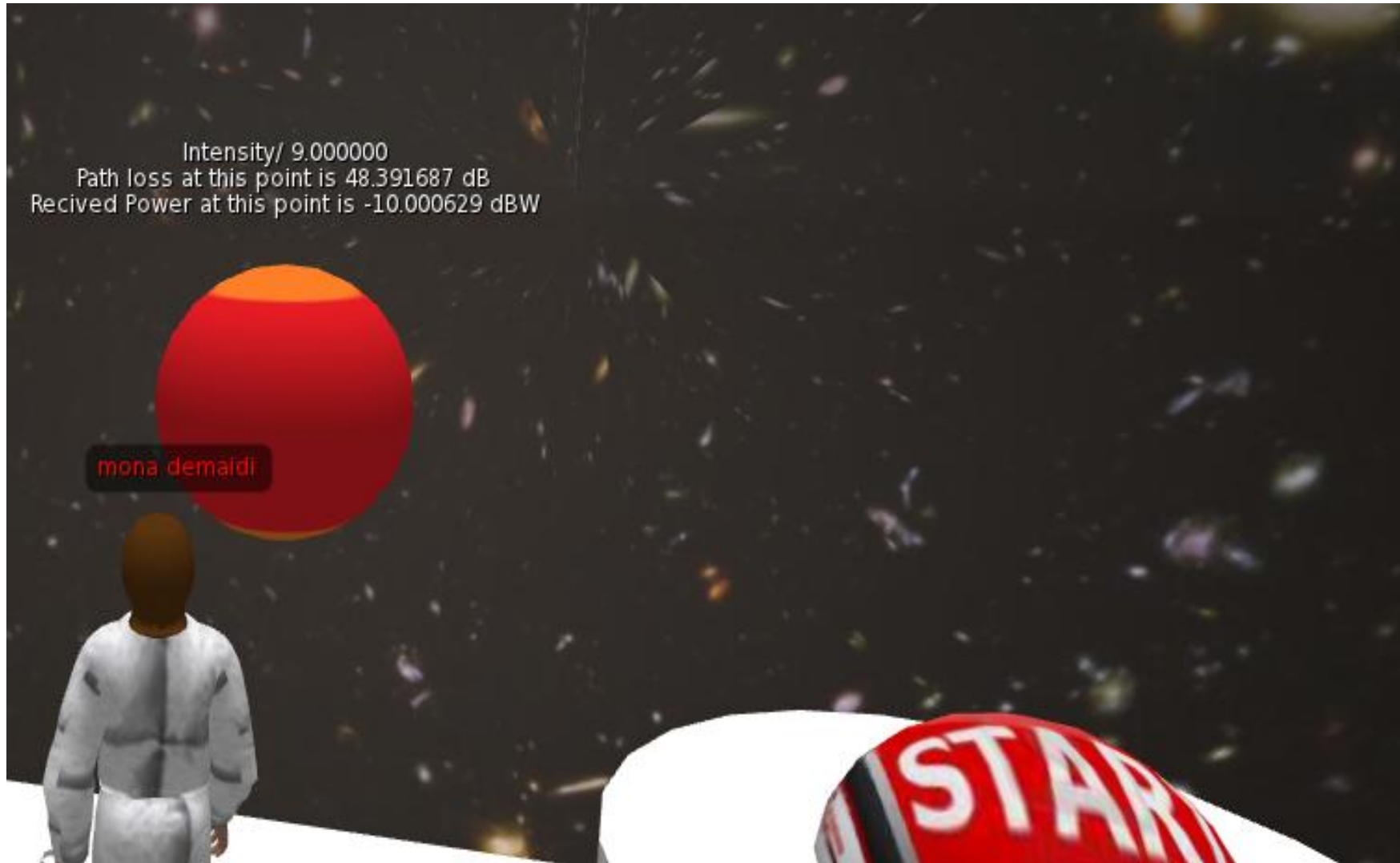Start Ray-Tracing

Delete Rays

Teleport

Teleport To Outerspace   Teleport To Earth

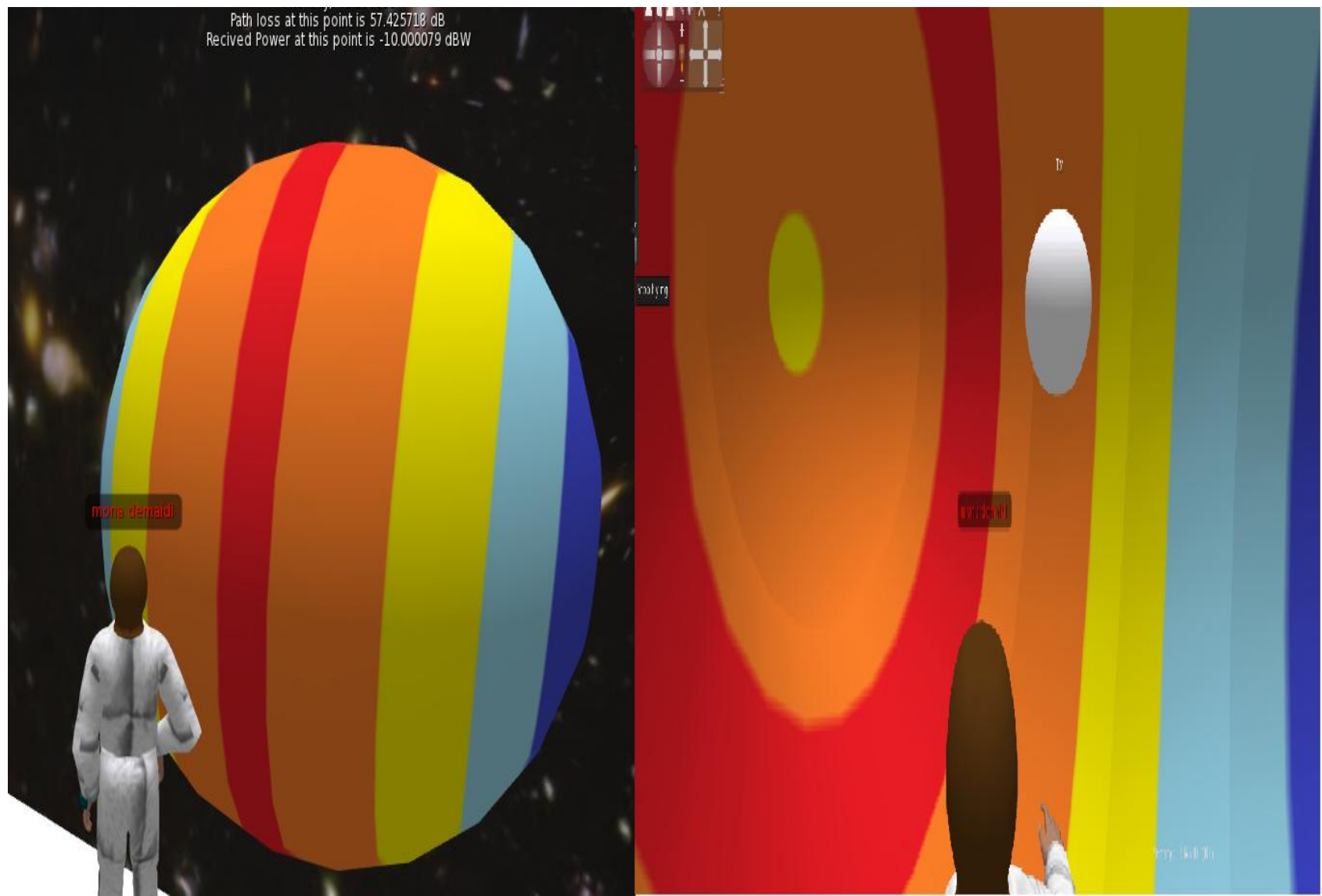Teleport Inside Sphere

Memory: 385376 (KB)
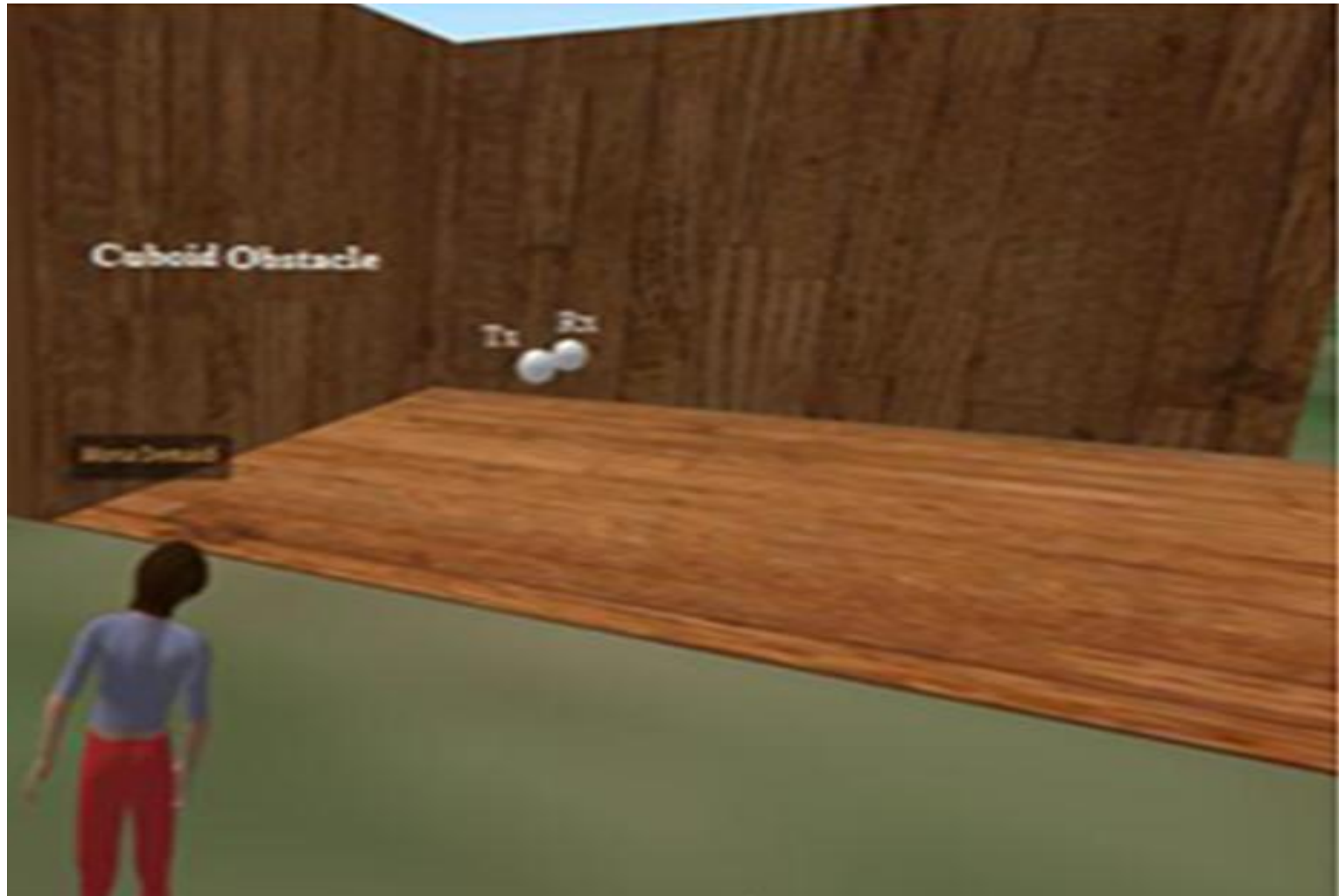
Free space propagation laboratory

Free space propagation laboratory

Intensity/ 33.640000
Path loss at this point is 54.096070 dB
Recived Power at this point is -10.000169 dBW
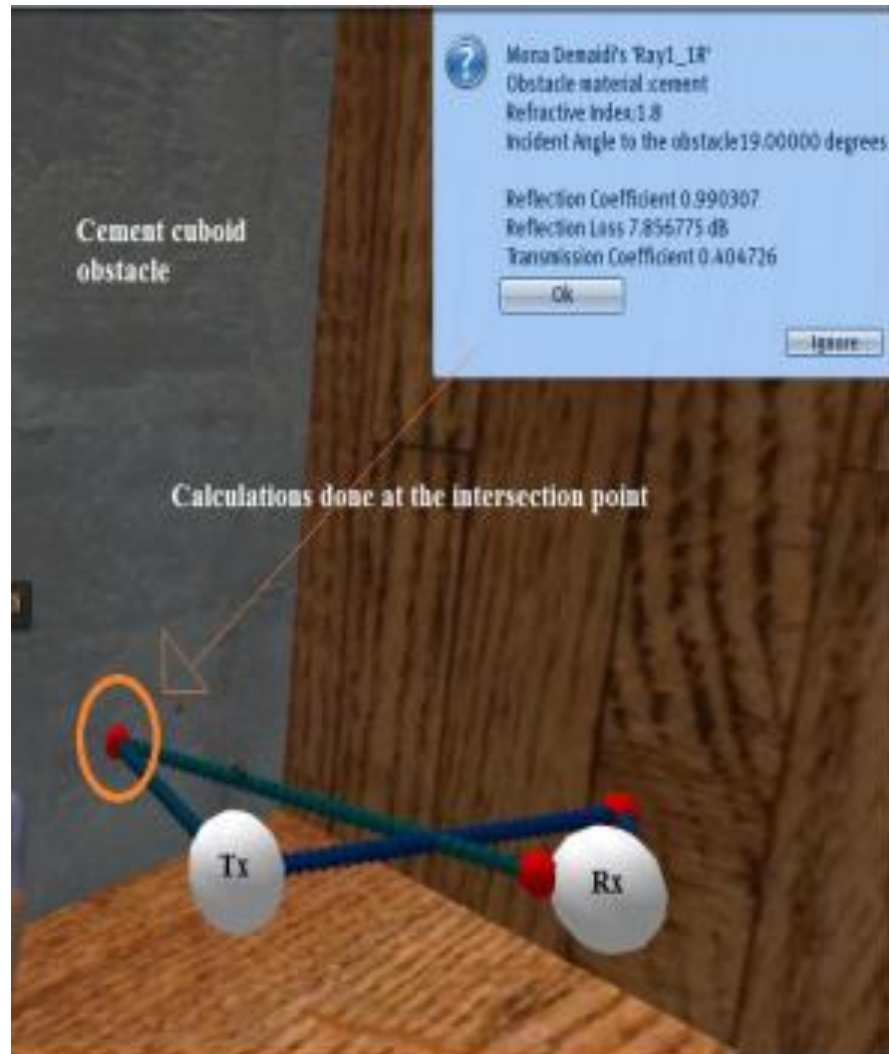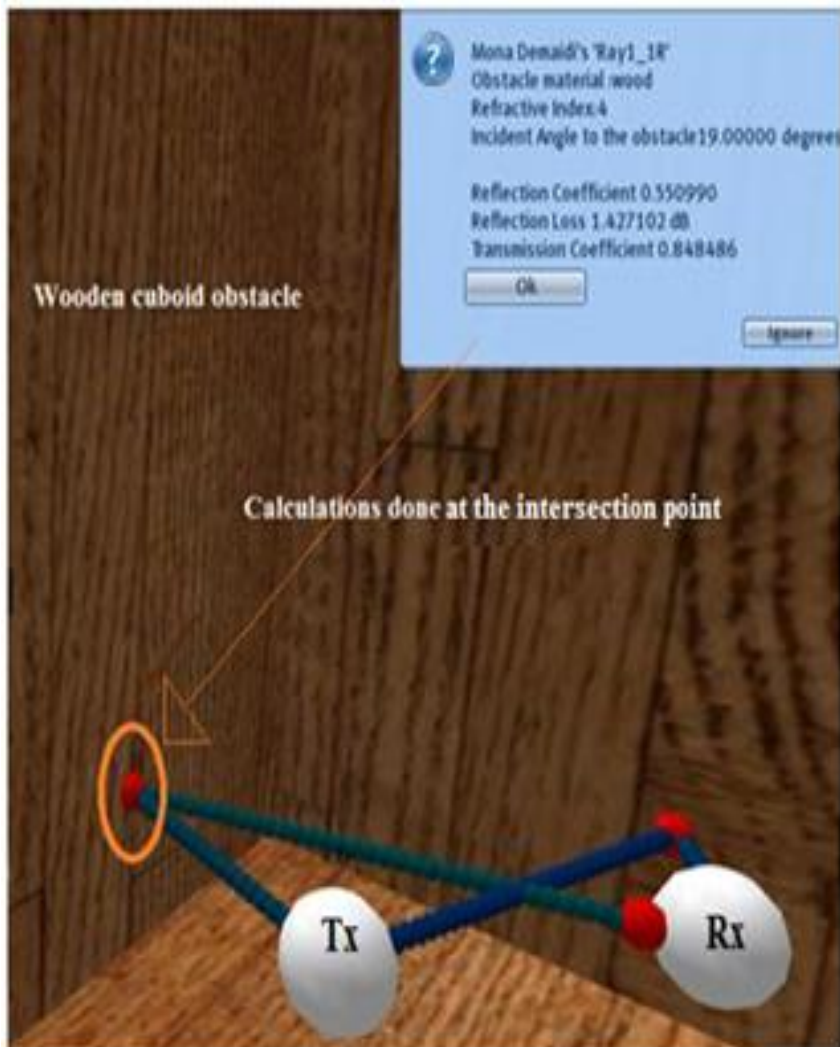
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Free space propagation laboratory

Wireless ray-tracing laboratory

Wireless ray-tracing laboratory

How is this useful

- **This environment is integrated with Moodle**

- **Teachers can set the tasks to students**

- **Student are asked questions to make sure they are on track**

Demo

CONCLUSION

- **In conventional learning environments students face challenges in understanding how signals propagate and interact with the surrounding environment.**

- **TROVE allows students to visualize wireless signal propagation behaviours in different environments. The prototype provides students with an immersive educational environment to learn different aspects related to signals and signals propagation**

THANK YOU