

Title: Application of artificial intelligence (AI) techniques to the characterization of materials based on measurements in waveguides.

Name of the hosting institution: University of the Basque Country UPV/EHU

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<https://www.ehu.eus/en/web/tsr-lab>

Location: Escuela de Ingeniería de Bilbao, BILBAO <https://maps.app.goo.gl/PBFzpxRhPpX6wetv5>

Aims of the traineeship/thesis: One of the research lines of the TSR research lab deals with the applications of electromagnetic fields, one of these applications being the electromagnetic characterization of materials. One of the techniques for characterizing these materials consists of partially filling a waveguide with a sample of material, taking measurements of signals transmitted and reflected, and extracting the characteristics of the material from the measurements. When extracting the values of the dielectric characteristics (complex permittivity) different methods can be applied. As measurements always involve errors or deviations from theory, deterministic methods do not seem to be the most appropriate. Therefore, the idea arises to create software based on artificial intelligence (AI) techniques that may be more suitable.

Based on the context presented, a Master Thesis is proposed with the aim of proposing and analyzing the feasibility of using AI techniques in the process of extracting dielectric characteristics of materials from real measurements, with the uncertainty that this entails.

[1] C. Yang and H. Huang, "Determination of Complex Permittivity of Low-Loss Materials From Reference-Plane Invariant Transmission/Reflection Measurements," in IEEE Access, vol. 7, pp. 131865-131872, 2019

Possibility of a scholarship for the Bachelor/Master's thesis: yes

PhD thesis opportunity after the Master course: Depending on the results

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