

Electromagnetic Modeling in Microwave Power Engineering with *Quick Wave-3D*

Short Course

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SYLLABUS

Part 1. Basic Issues

Lecture 1. Introduction & Theoretical Background in Electromagnetics

- Introduction to the Course. Review of EM Simulators & Test Example
- Related Theoretical Points in Electromagnetics
- Conceptual Issues in Modeling of Microwave Heating: What's and How's

Lecture 2. Mathematical and Computational Topics

- Basics of the Method of Analysis: Finite Difference Time Domain
- Philosophy and Key Principles of *QuickWave-3D*

Part 2. Aspects of Efficient Modeling

Lecture 3. Concepts in Pre-Processing

- QW*-Editor: Building Scenarios: Elements and Objects. Mesh Control.
- Modal Templates. Excitation of Structures.

Lecture 4. Concept in Simulations

- QW*-Simulator: Operational Regimes, Post-Processing, Export Options.
- QW*-Basic Heating Module: Philosophy & Operations.

Lecture 5. Optimization Techniques

- QW*-Optimizer: Concepts & Practice.
- External Control over *QuickWave-3D*.
- Elements of Computer-Aided Design.

Part 3. Practical Models of Systems & Processes

Lecture 6. Closed Problems – Waveguide Components and Cavities

- Waveguide Junction with a Post
- High Power Water Load

Lecture 7. Advanced Closed Scenarios

- Water Cylinder in a Waveguide Section: Project in Optimization
- Water Cylinder in a MW Oven: Project for the Basic Heating Module

Lecture 8. Open Problems – Radiation and Antennas

- Slotted Waveguides as Radiating Elements
- Microwave Drill
- Conclusion

General Discussion