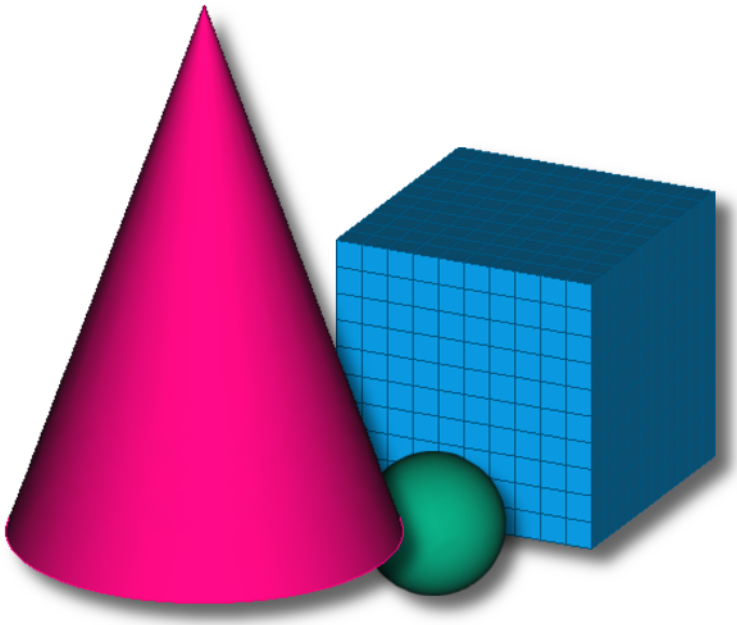

QW-MODELLER 2017

FOR QUICKWAVE

SOFTWARE FOR ELECTROMAGNETIC DESIGN AND SIMULATIONS

QWED has continued efforts on extending availability and functionality of the *QW-Modeller* for *QuickWave* software for electromagnetic design as well as the scope of its applications.

The most visible change in *QW-Modeller 2017* is the reorganised Ribbon, which groups all necessary commands that guide the user during project preparation: defining basic project settings, drawing 3D and planar geometries, setting excitation type and its parameters, boundary conditions, meshing, configuring microwave heating simulation (with Basic Heating Module), setting postprocessings, and starting simulation process.

The new *QW-Modeller Help* system provides easier and faster access to the specific topics. The *QW-Modeller Help* system is divided into subcategories and is available from the Ribbon and most of dialogues of *QW-Modeller*.

The *Basic Heating Module* is now enhanced with a wide variety of options, allowing defining complete BHM process directly from *QW-Modeller* interface, which include intuitive configuration of Rotation Axes, Movement Trajectories, declaring variable heating steps etc.

The effective and practically useful solution for simulation convergence monitoring has been recently enabled in *QuickWave*. It utilises monitoring of the electromagnetic (EM) energy in the calculation model and stopping the simulation when it decays to a certain level. This allows reducing the number of performed FDTD iterations and as a result the computing time, without reducing a computational accuracy. This solution is now available for configuring in *QW-Modeller* as *Energy Stop Criterion* feature.

QuickWave allows for analysing infinitely thin metal layers (metal layers of zero thickness). This allows avoiding small cells, and thus prolonging the simulation time, resulting from very small thickness of metal conductors in planar structures. The thin metal layers are enabled in XY plane and now can be created in *QW-Modeller* from face and cross-section.

To facilitate using *QW-Modeller* and *QuickWave* in microwave courses, the examples investigating basic electromagnetic scenarios has been included, as well as a short background description. These examples, together with microwave background description, become complementary introductory to fundamental microwave phenomena.

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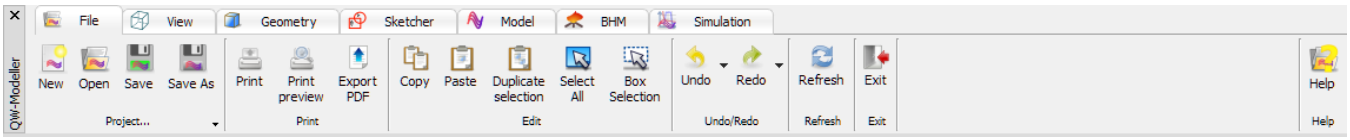
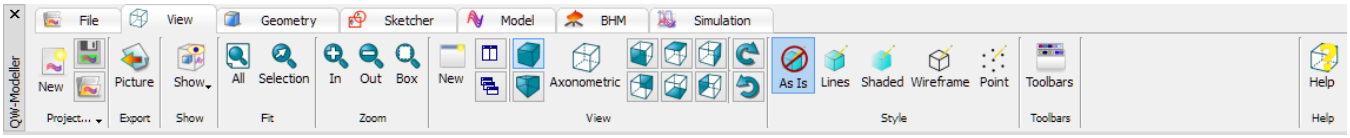
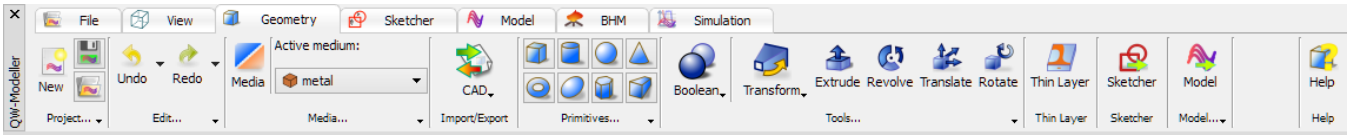
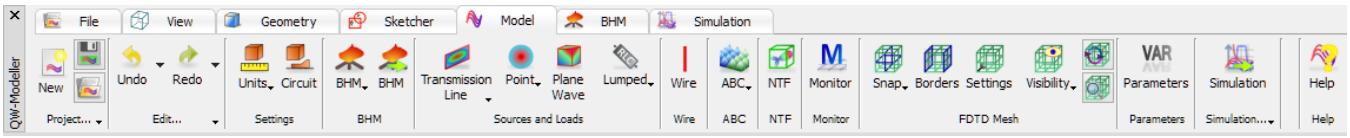
RIBBON GUI

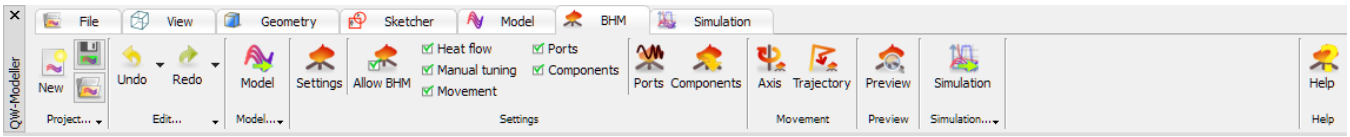
The Ribbon of *QW-Modeller* groups all necessary menus and commands that guide the user during project preparation: defining basic project settings, drawing 3D and planar geometries, setting excitation type and its parameters, boundary conditions, meshing, configuring microwave heating simulation (with Basic Heating Module), setting postprocessings and starting simulation process.

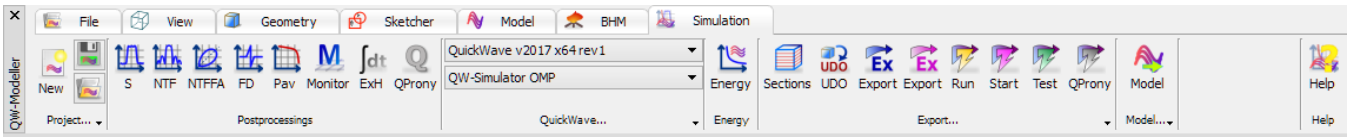












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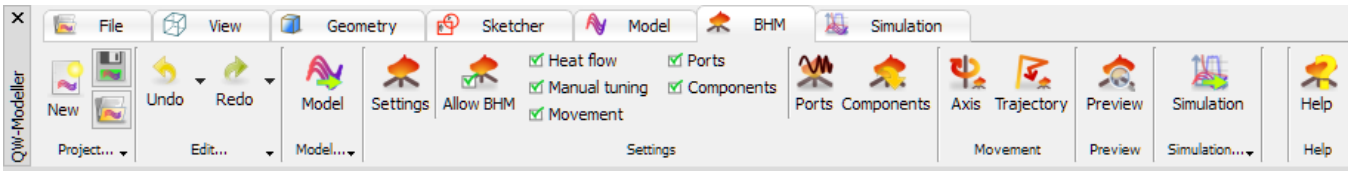
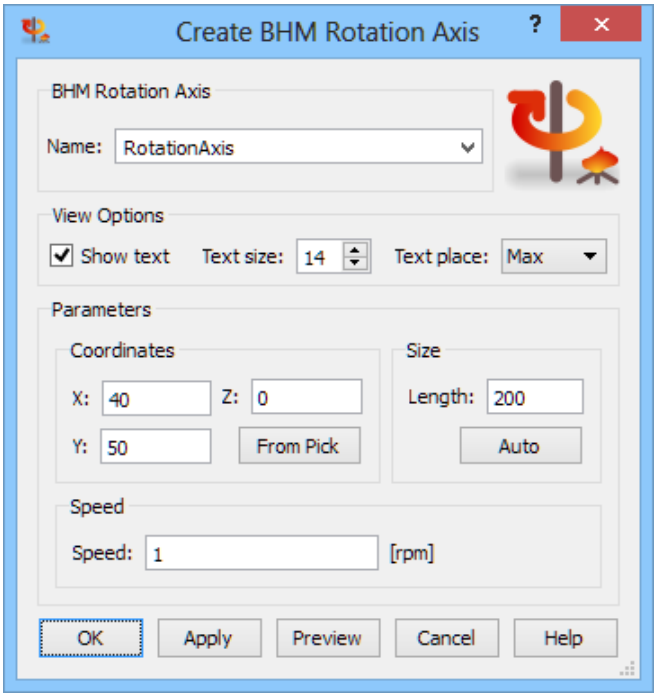
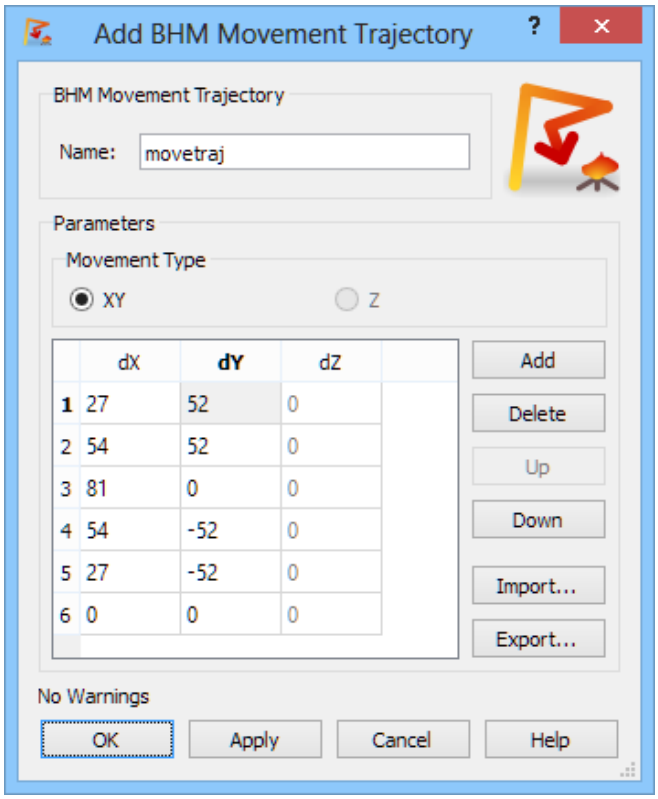
BASIC HEATING MODULE IMPROVEMENTS

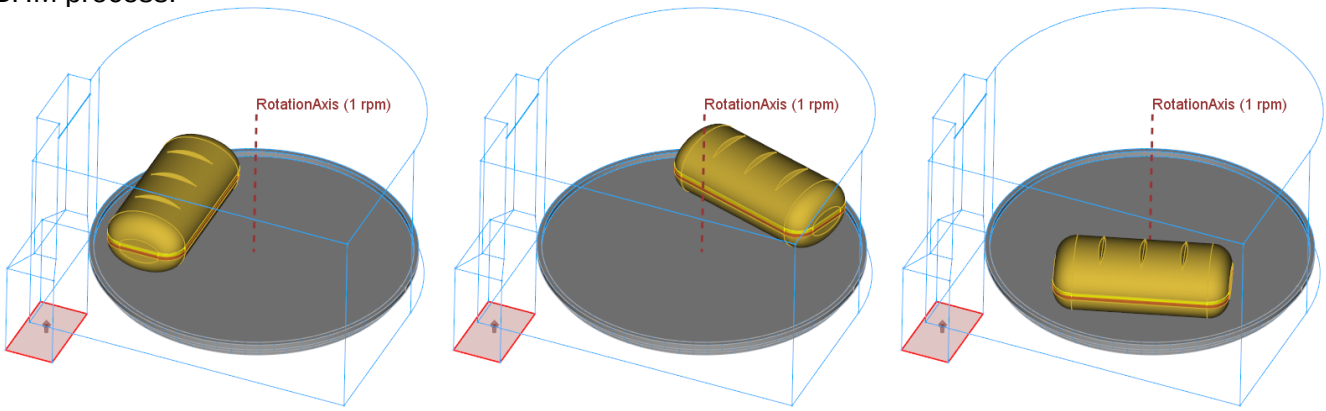
The Basic Heating Module is now enhanced with a wide variety of options, allowing defining complete BHM process directly from *QW-Modeller* user interface, which include intuitive configuration of Rotation Axes, Movement Trajectories, declaring variable heating steps etc. The *Heating Details* dialogue allows also for enforcing suspension and/or freeze of the simulation after each or user defined number of BHM step.







The *BHM Preview* dialogue allows previewing the consecutive steps of load(s) movement defined in BHM process.



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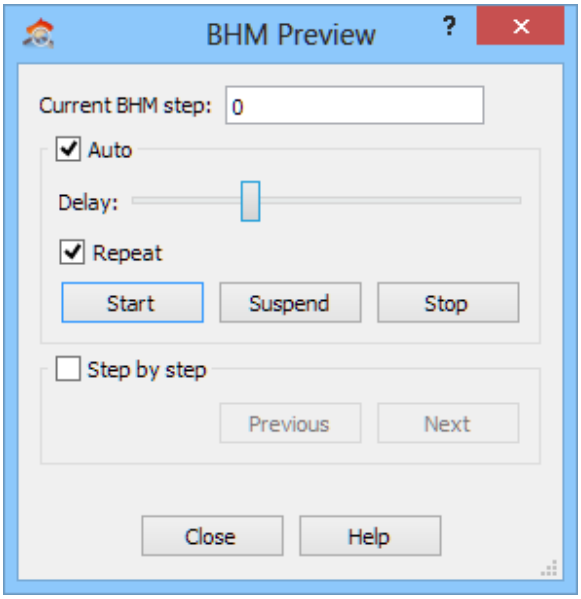
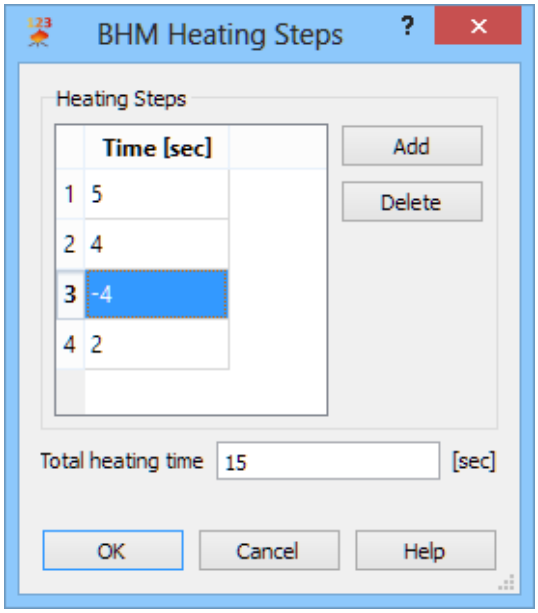
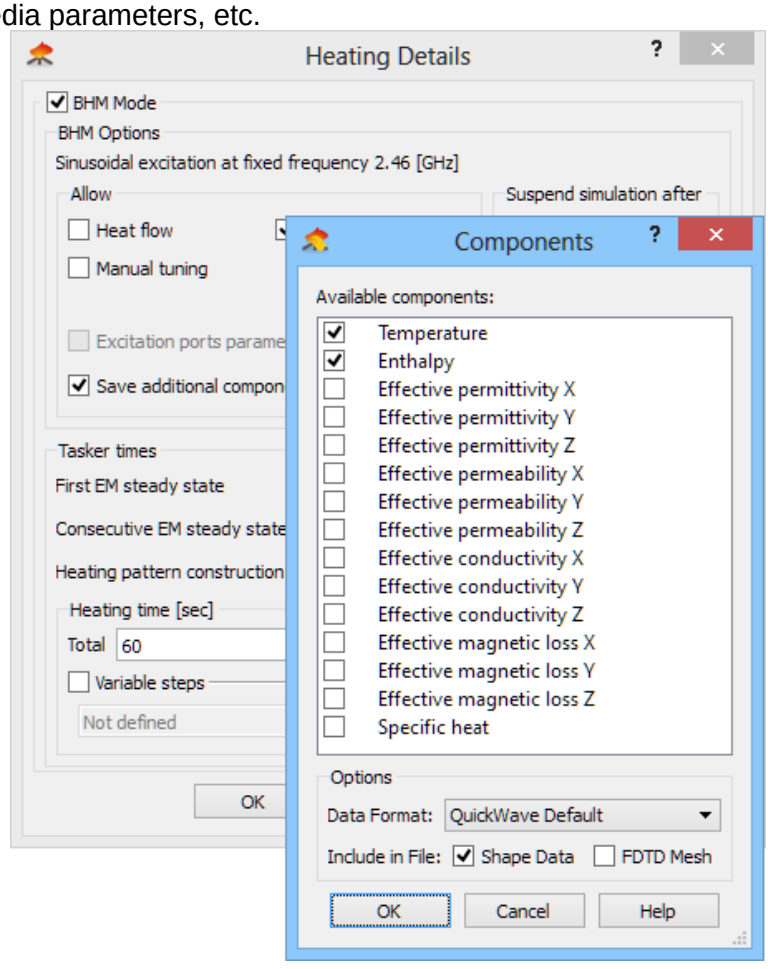




The *BHM Heating Steps* dialogue can be invoked from *Heating Details* dialogue and it allows defining different heating time for each BHM step.

The user is also allowed to enable saving, in each BHM step, parameters other than temperature, e.g. enthalpy, effective media parameters, etc.



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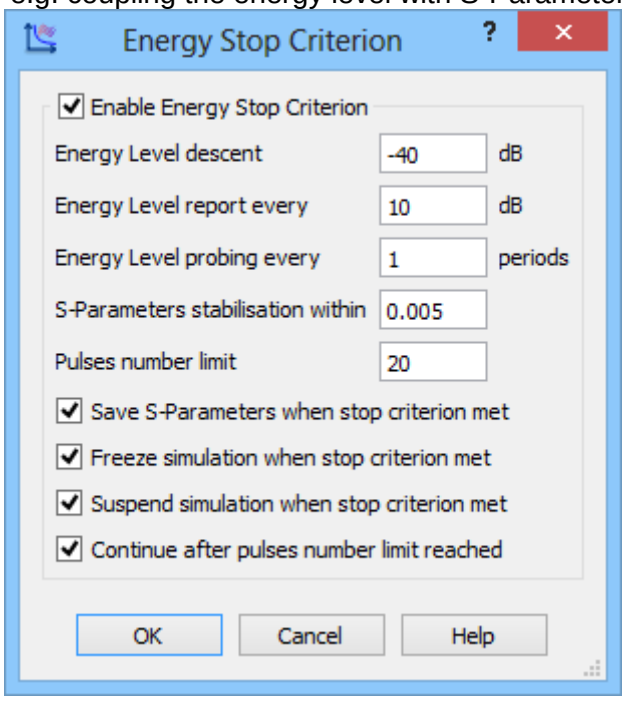
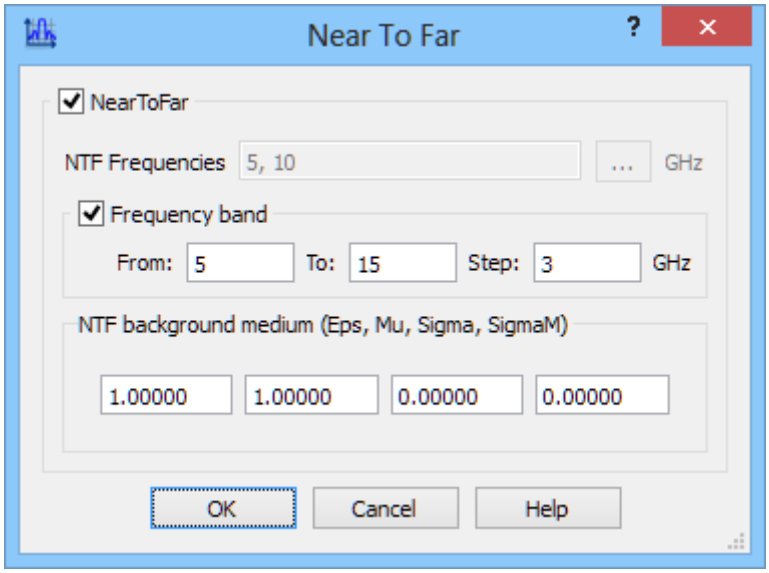
ENERGY STOP CRITERION

The effective and practically useful solution for simulation convergence monitoring has been introduced. It is enabled for pulse excitation with a finite duration time and utilises monitoring of the electromagnetic (EM) energy in the calculation model and stopping the simulation automatically when it decays to a certain level. This allows reducing the number of performed FDTD iterations and as a result the computing time, without reducing computational accuracy. This solution is now available in *QuickWave* as Energy Stop Criterion feature, which is supplemented with several options additionally restricting the stop criterion, e.g. coupling the energy level with S-Parameters results fluctuations.



NTF FREQUENCY BAND

The radiation pattern and scattering pattern will be calculated at all frequencies specified by giving directly their values (as previously available) or by declaring the frequency range and frequency step between consecutive values.



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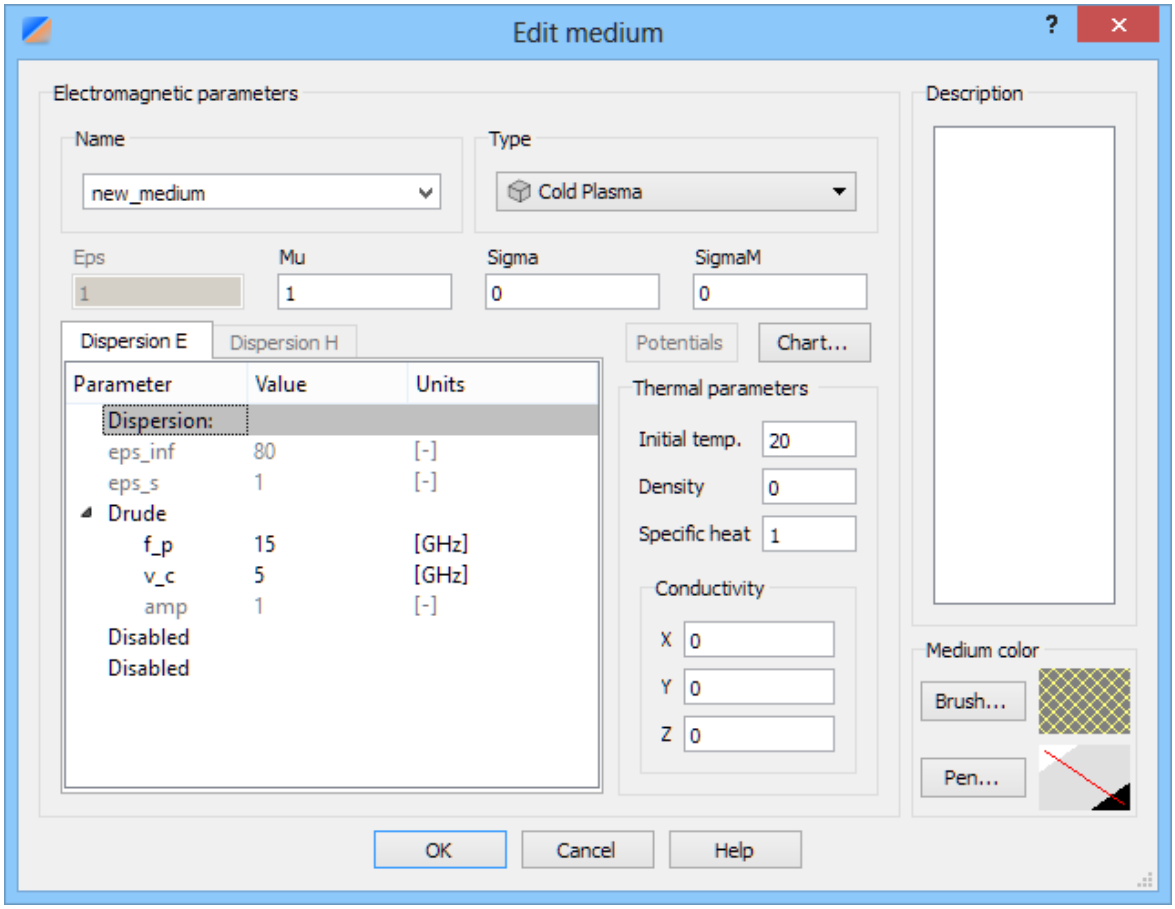
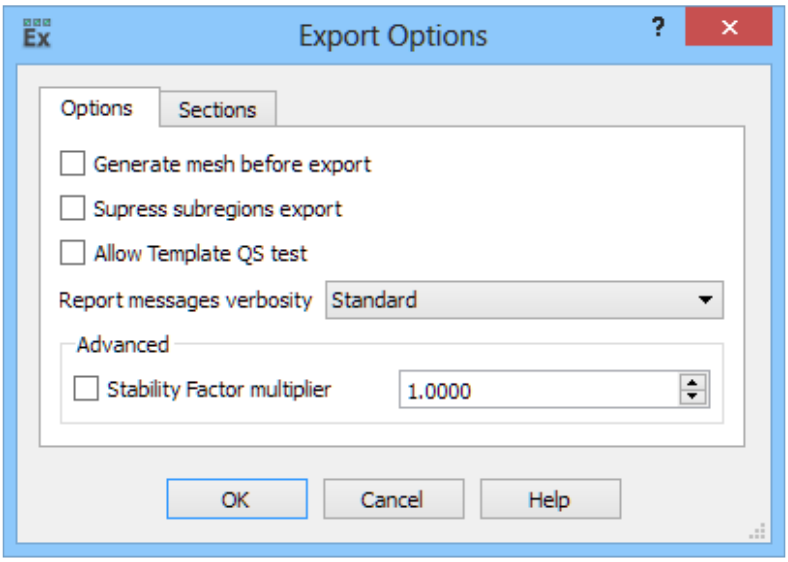
COLD PLASMA MATERIAL

The new Cold Plasma material has been introduced. Its complex relative permittivity (including series losses) is given by single-pole *Drude* dispersion model with user-specified parameters.



NEW EXPORT OPTIONS

The option for diagnostic run for TEM template ports and Stability Factor multiplier value (used to modify standard stability factor assumed in *QuickWave*) has been introduced in *Export Options* dialogue.



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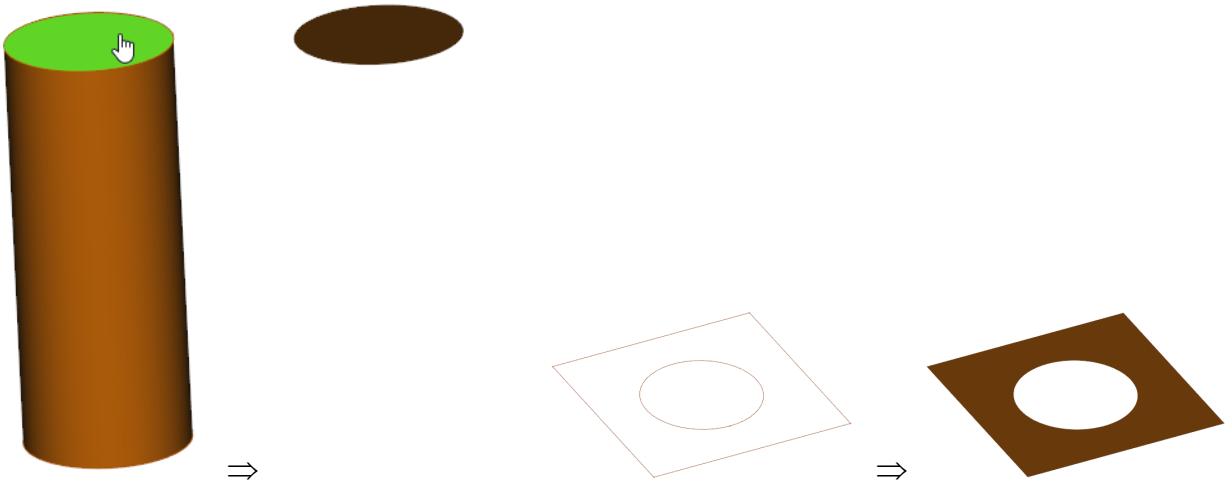
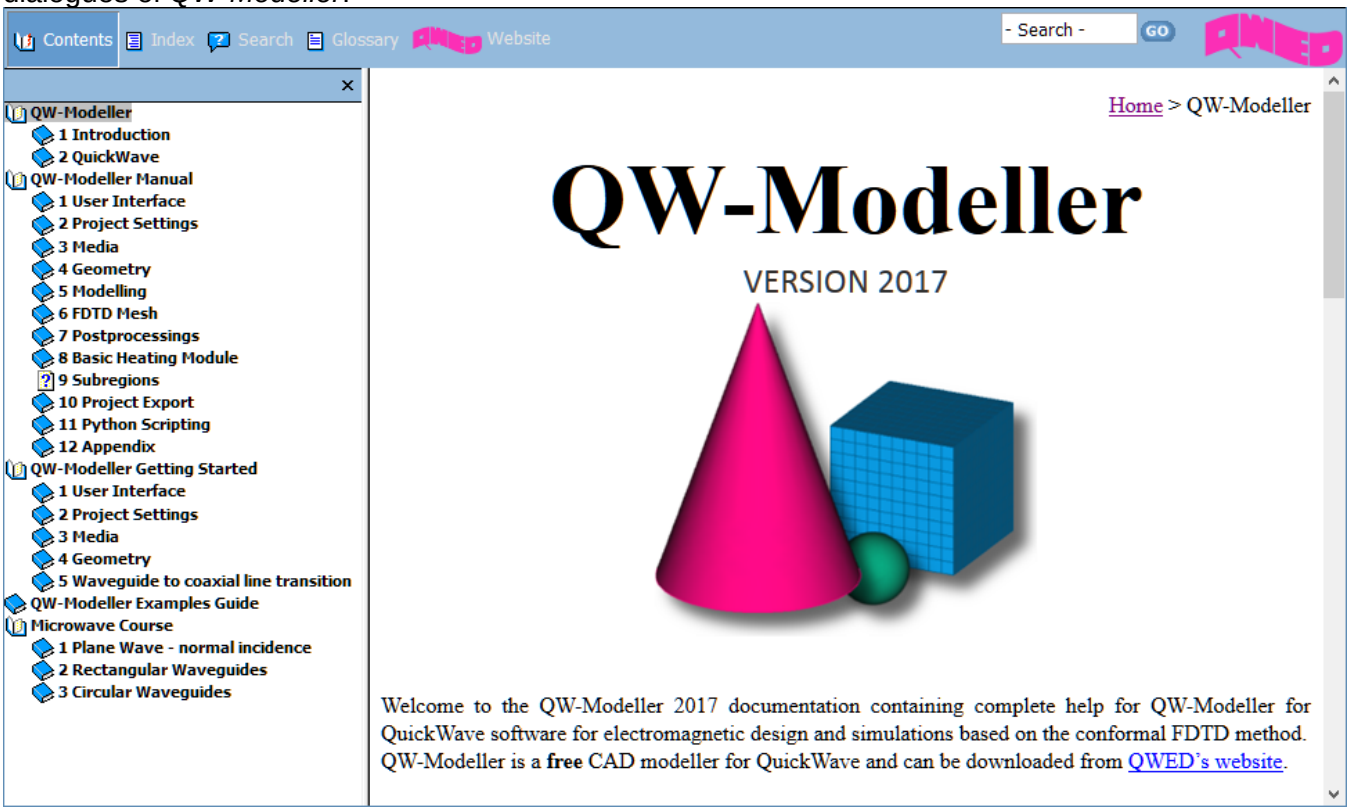
THIN LAYERS

The infinitely thin metal layers (metal layers of zero thickness) allow avoiding small cells, and thus prolonging the simulation time, resulting from very small thickness of metal conductors in planar structures. The thin metal layers can be analysed in *QuickWave* in XY plane and now can be created in *QW-Modeller* from face and cross-section.



NEW HELP SYSTEM

The new *QW-Modeller Help* system provides easier and faster access to the specific topics. The *QW-Modeller Help* system is divided into subcategories and is available from the Ribbon and most of dialogues of *QW-Modeller*.



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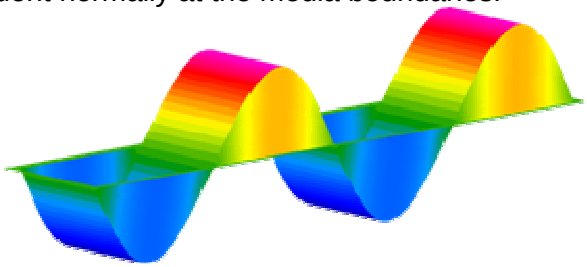
MICROWAVE COURSE

To facilitate using *QW-Modeller* and *QuickWave* in microwave courses, the examples investigating basic electromagnetic scenarios are included, as well as a short background description. These examples, together with microwave background description, become complementary introductory to fundamental microwave phenomena. All the interesting features and behaviours are visualised using electromagnetic simulation with *QuickWave* software.

All examples were prepared in free CAD *QW-Modeller* for *QuickWave* and the models preparation procedures are described in separate documents. All examples considered herein are included in the *QW-Modeller* and *QuickWave STUDENT Release* installation as both, *QW-Modeller* and *QW-Editor* projects.

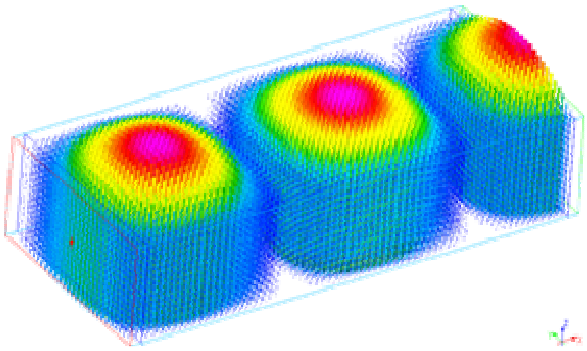
Plane Wave - normal incidence

The aim of this training is to point out main properties and behaviour of the plane wave propagating in an isotropic medium and incident normally at the media boundaries.



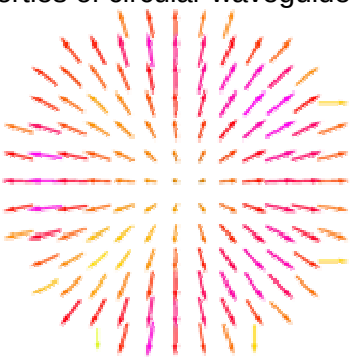
Rectangular Waveguides

Waveguides are transmission lines commonly used in electronics, especially in higher frequency ranges like microwaves. A waveguide can be simply described as a metal pipe usually filled with air. This tutorial is dedicated to rectangular waveguides and contains all basic information concerning their operation rules.



Circular Waveguides

This tutorial is dedicated to basic properties of circular waveguides.



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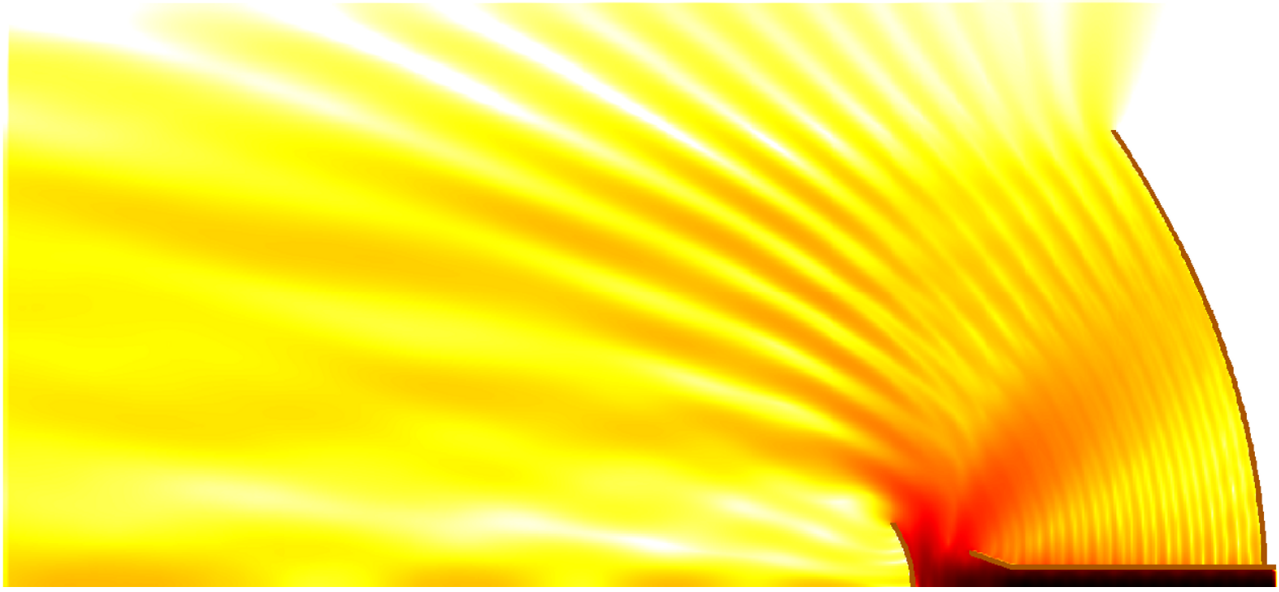
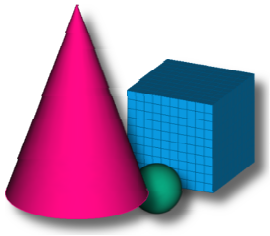


Design is as simple as it can be.

Simulation is as fast as you want it to be.

Results are as accurate as they should be.



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