

QUICKWAVE 2018

SOFTWARE FOR ELECTROMAGNETIC DESIGN AND SIMULATIONS

QUICKWAVE-3D QUICKWAVE-BOR

QW-MODELLER

QW-ADDIN FOR AUTODESK® INVENTOR® SOFTWARE

QW-BHM QW-GPUSIM QW-MULTIGPUSIM QW-OPTIMISERPLUS QPRONY



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

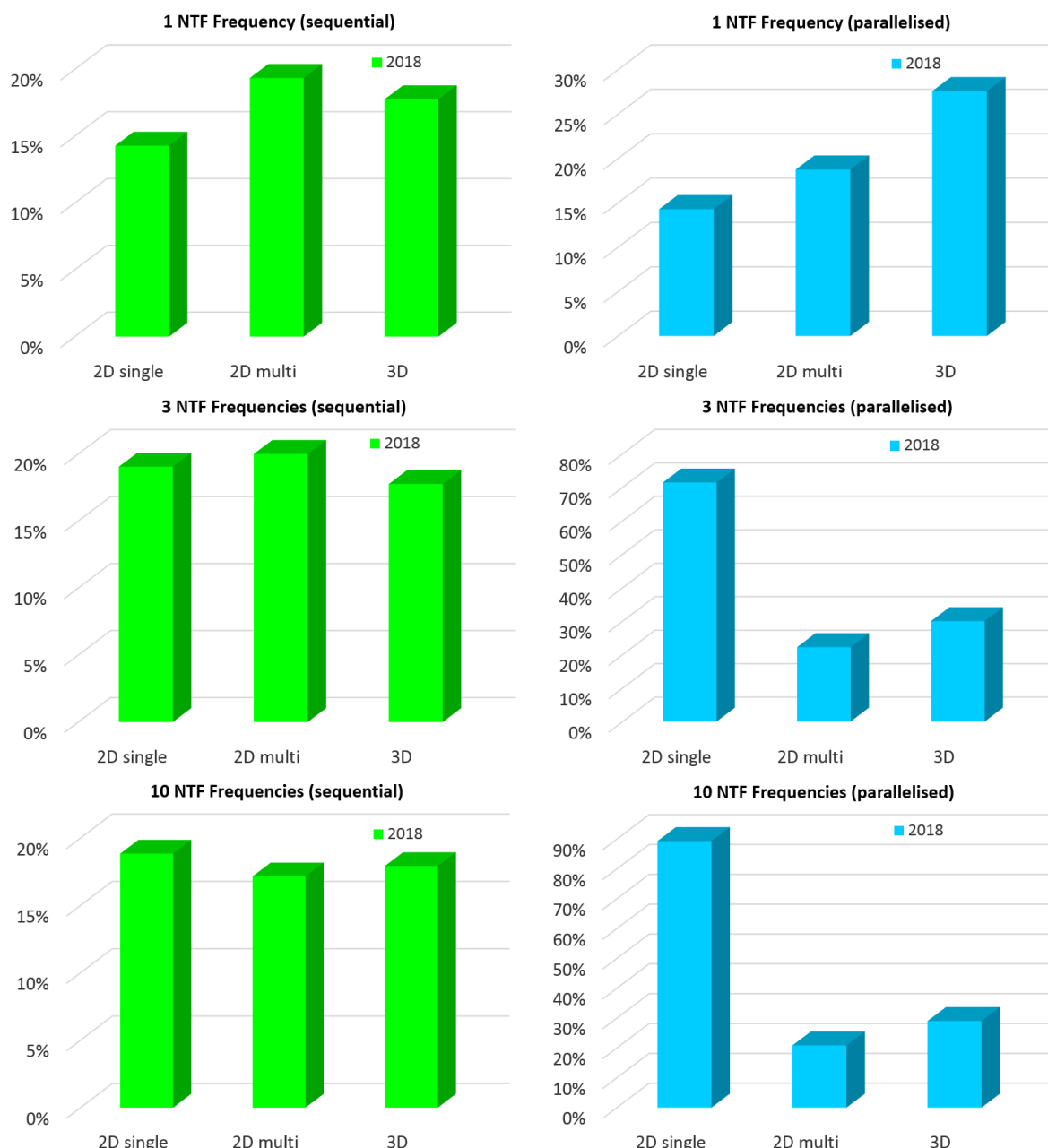
Our longstanding experience in EM modelling shows that the simulation speed is an important issue. Radiation pattern calculations for very complicated or very big problems could take long time. In this release we focused on the speed of calculations of the radiation pattern. The calculating procedures were optimised to achieve a maximum speed of calculations – the sequential procedures are around 20% faster compared to the previous versions of *QuickWave*. Radiation pattern calculations have been fully parallelised for multiple NTF frequencies analysis.

MultiGPU version of *QW-Simulator* allows very fast simulations of large real-life problems with very high accuracy of the simulation results by taking advantage of extremely high performance of multiple graphic cards. Now, *MultiGPU* version of *QW-Simulator* allows fast radiation pattern calculations within fully parallelised calculation procedures.

Enhancements in simulation results presentation are always of our high interest. New display types and flexible display options in the 2D/3D Fields Distribution, Fields Monitor and 3D Radiation Pattern windows allow adjusting results displays to users' preferences.

RADIATION PATTERNS CALCULATIONS

The radiation patterns calculation was accelerated for sequential and parallelised approach. For sequential QW-Simulator, calculations procedures are 20% faster. The radiation patterns calculations in the QW-Simulator GPU and MultiGPU have been also significantly accelerated. Calculation procedures in multiple NTF frequencies analysis are NTF frequency-parallelised.



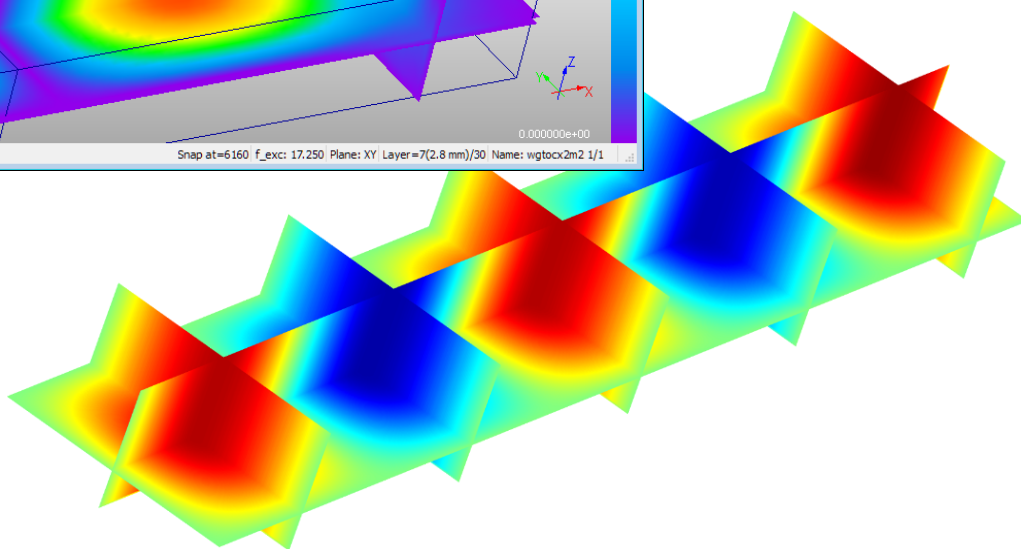
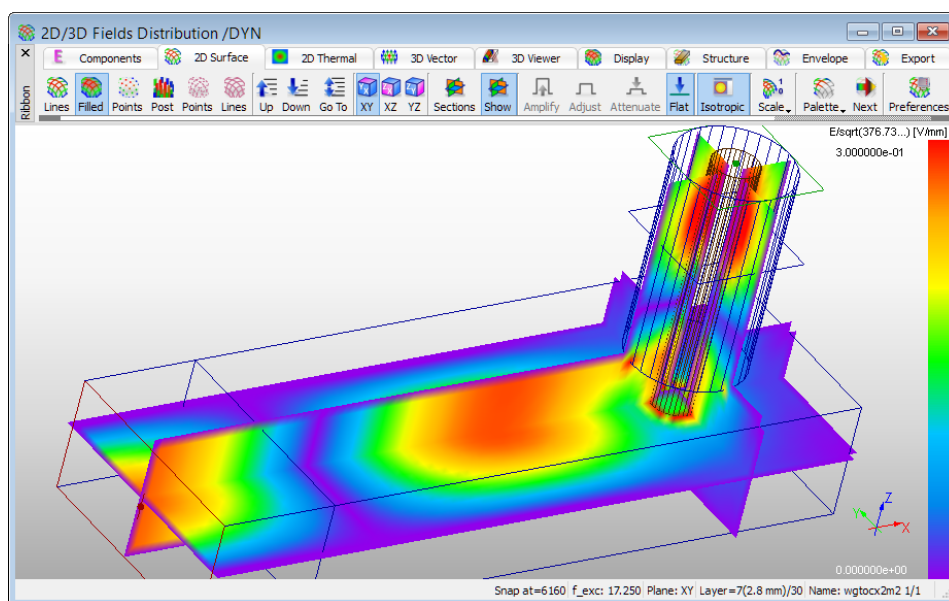
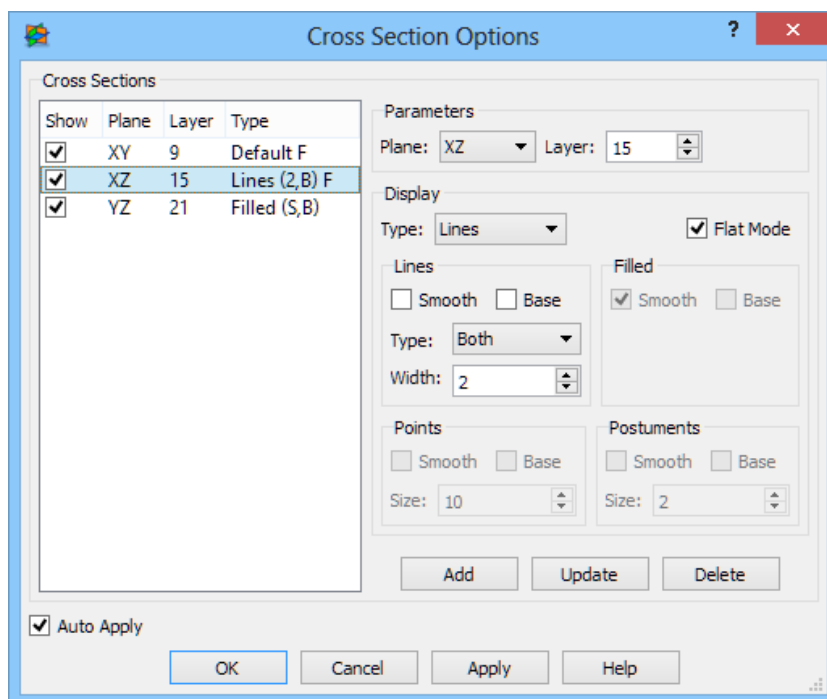
Speed-ups of the radiation pattern calculations compared to QuickWave 2017.

Note: In the above charts, *2D single* stands for a single 2D radiation pattern (for a given set of θ and ϕ angles) and *2D multi* describes a set of 2D radiation characteristics (for a given value of θ/ϕ angle and a grid of ϕ/θ angle values). *3D* stands for a 3D radiation pattern results in a spherical coordinates.

From QuickWave 2018, supplemental information about radiation pattern calculation settings as well as physical time of radiation pattern calculations are displayed in the Simulator Log window.

2D SURFACE CROSS SECTIONS

The new regime for 2D Surface Art displays, cross section planes, allows showing additional fields' planes along each axis at the same time. The cross section can be defined in the *Cross Section Options* dialogue.



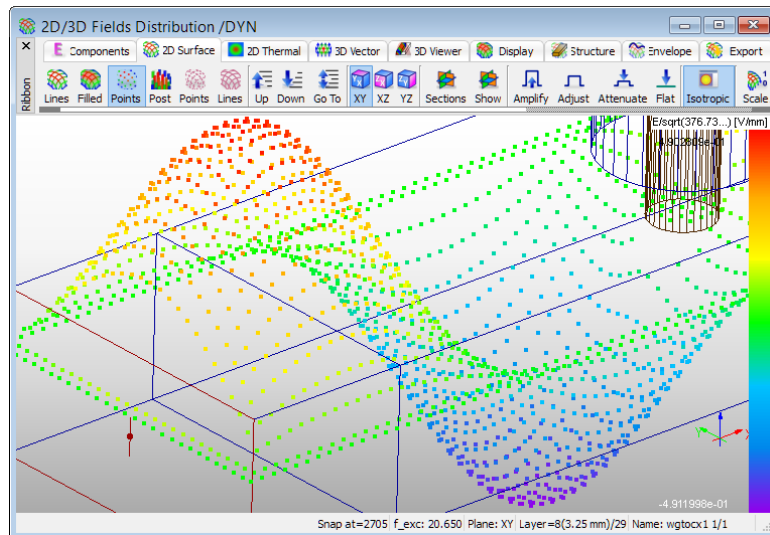
NEW 2D SURFACE ART DISPLAY TYPES

New types of 2D surface display, Points Art and Postuments Art are available.

Points Art display presents all cells as points and colour is assigned to show the magnitude of the displayed component.

The Points Art display is equipped with additional options:

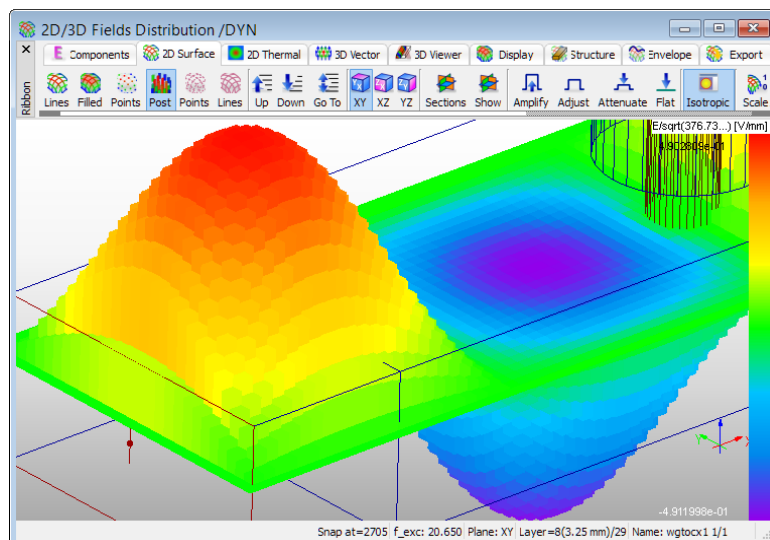
- *Smooth* – points will be of the circular shape (square shape is used as a default)
- *Base* – additional flat fields display will be shown at the base level
- *Size* – allows setting a size of a single point



Postuments Art display presents all cells as postuments and colour is assigned to show the magnitude of the displayed component.

The Postuments Art display is equipped with additional options:

- *Smooth* –each field vertex of the cell will be drawn separately to show smooth display (compared to Filled display)
- *Base* –additional flat fields display will be shown at the base level and the sides of the postuments will be drawn
- *Size* – allows setting a size of a single postument (2 means that postument size will be cell size divided by 2 in each direction from the centre of the cell, 10 means that postument size will be cell size divided by 10 in each direction from the centre of the cell)

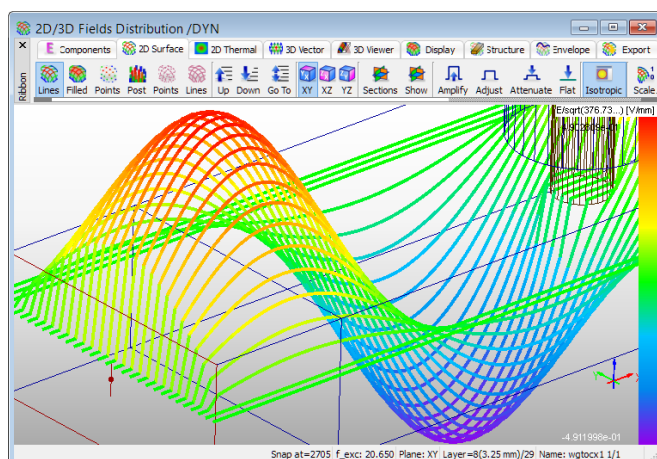
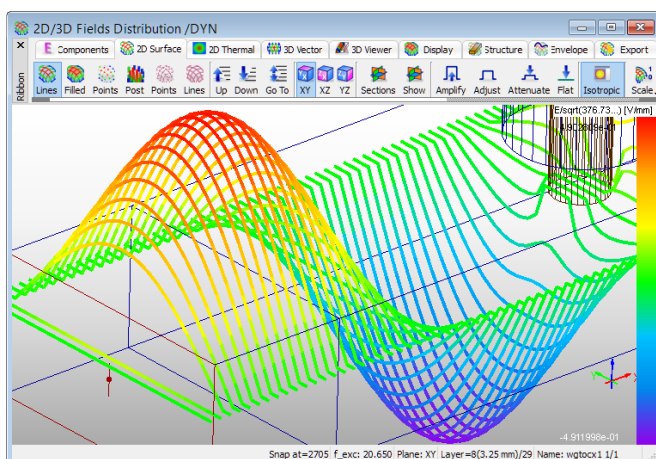


ADDITIONAL OPTIONS FOR 2D SURFACE LINES ART AND FILLED DISPLAYS

New options for 2D surface displays, Lines Art and Filled are available.

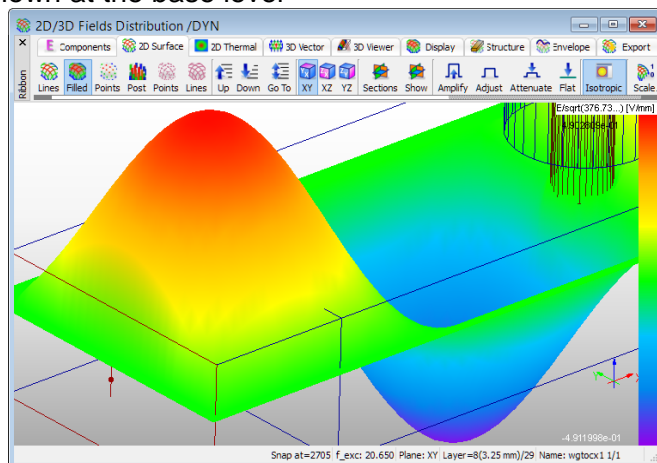
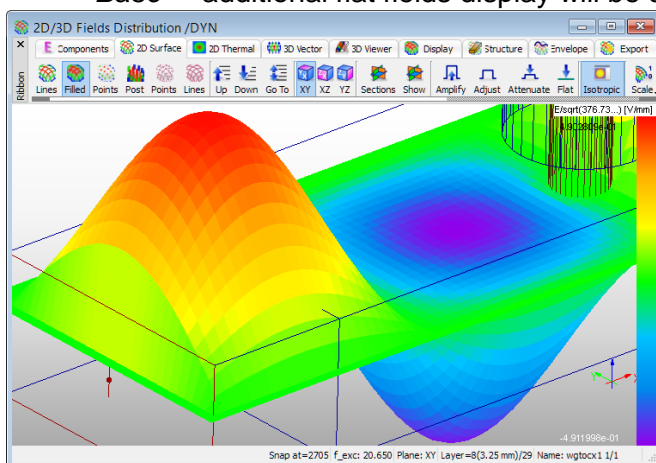
The Lines Art display is equipped with additional options:

- *Smooth* – the displayed lines will be smooth
- *Base* – additional flat fields display will be shown at the base level
- *Type* – allows choosing a type of the lines (Horizontal, Vertical or Both)
- *Width* – allows setting a width of a single line



The Filled display is equipped with additional options:

- *Smooth* – the colours inside the cell are approximated to achieve smooth display
- *Base* – additional flat fields display will be shown at the base level

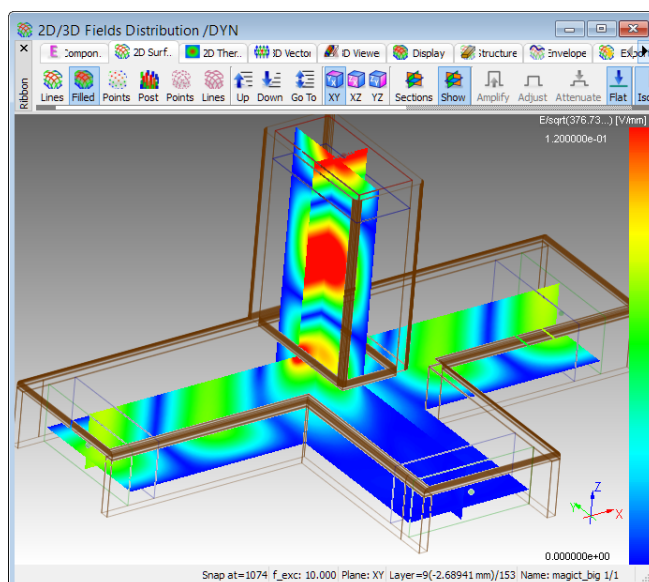
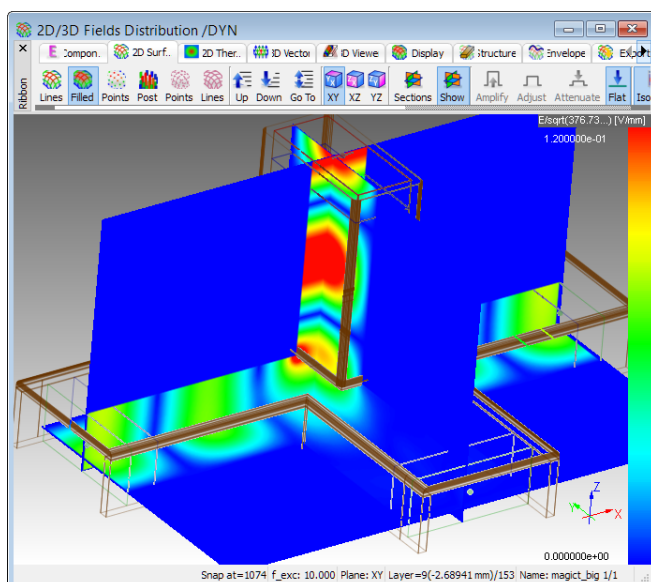
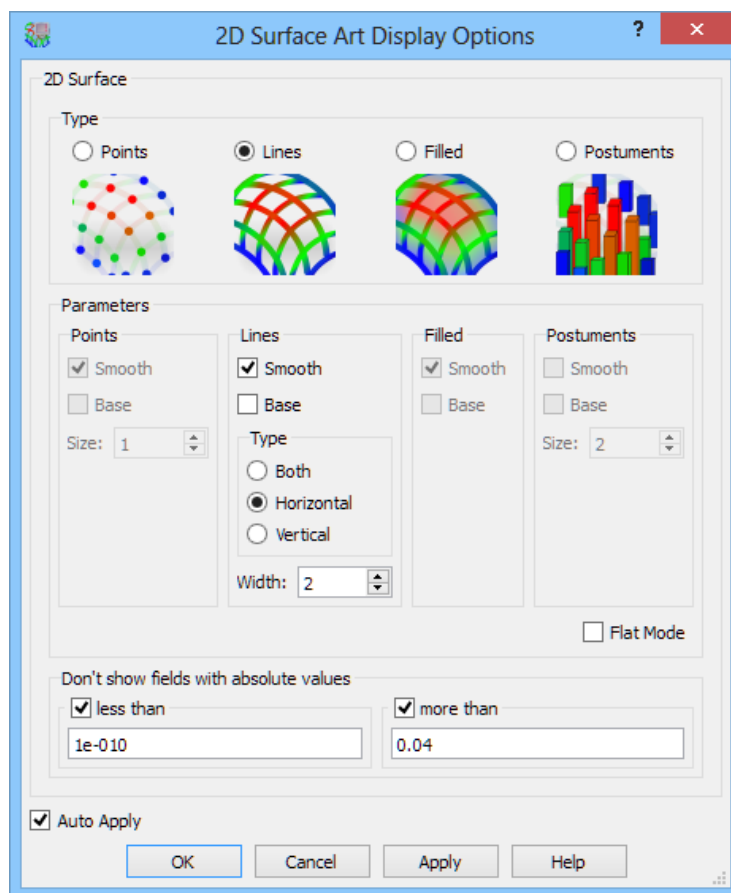


These options can be set in the 2D Surface Art Display Options dialogue.

OPTIONS FOR THRESHOLDING OF FIELDS

Options for not displaying fields with values below or over specified threshold are available for 2D Surface Art displays.

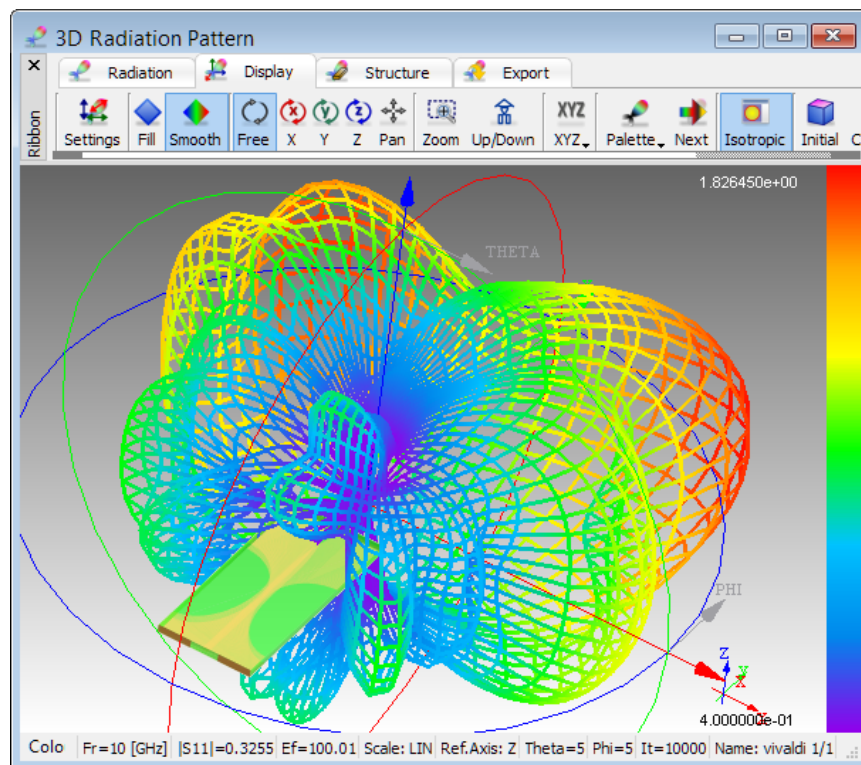
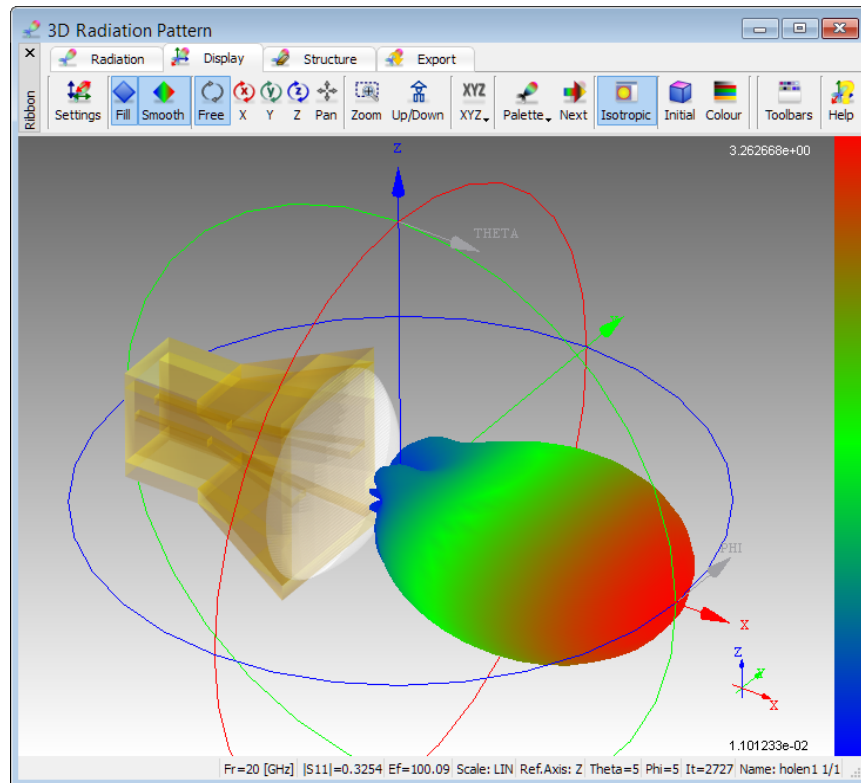
These options can be set in the 2D Surface Art Display Options dialogue. The *Don't show fields with absolute values* frame allows choosing lower (by checking the *less than* option) and upper (by checking *more than* option) limit for absolute fields' value that will be shown on the display.



3D RADIATION PATTERN

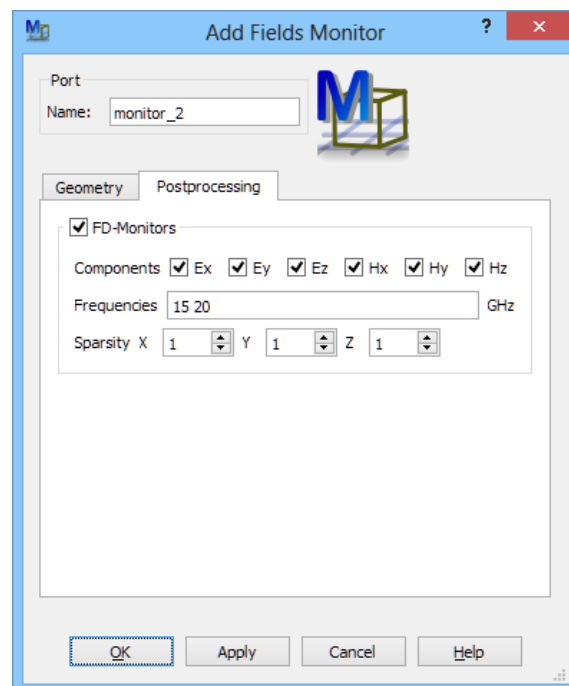
The 3D Radiation Pattern display is equipped with additional options:

- *Smooth* – switches the display of far field radiation pattern plot between discrete and smooth regimes
- *Line Width* – allows setting a line width of wired far field radiation pattern plot



FIELDS MONITOR POSTPROCESSING SETTINGS CAN BE MADE SEPARATELY FOR EACH FIELDS MONITOR

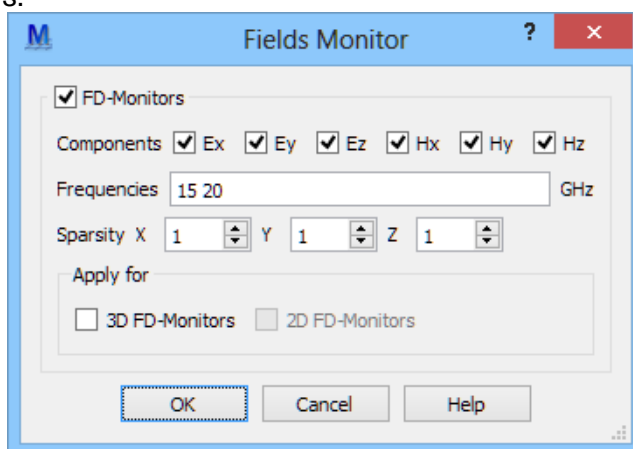
Each *Fields Monitor* has its own *Components*, *Frequencies*, and *Sparsity* parameters, which can be set in *Add Fields Monitor/Edit Fields Monitor* dialogue.



SPARSITY FACTOR CAN BE SET SEPARATELY FOR EACH DIRECTION FOR FIELDS MONITOR POSTPROCESSING

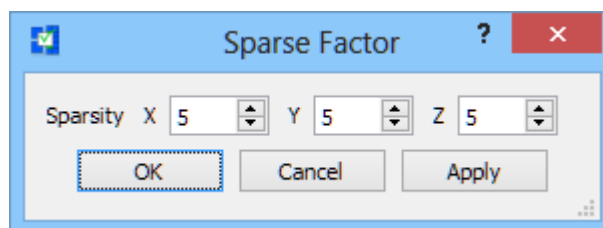
Theoretically, any number of *Fields Monitors* and frequencies can be considered. However, collecting the data for many frequencies and *Fields Monitors* may become quite consuming in terms of computer resources. For that reason, data collection can be accelerated by setting a *Sparsity* factor in space higher than 1. *Sparsity* factor can be set separately for each direction. For the sparsity N greater than 1, the following components: *Etot*, *Htot*, *S*, *Sx*, *Sy*, *Sz*, *PdE*, *PdH*, *Pd* and *pd* values will be estimated from the nearest N -th cell.

Each *Fields Monitor* has its own *Components*, *Frequencies*, and *Sparsity* parameters, which can be set in *Add Fields Monitor/Edit Fields Monitor* dialogue. Those individual parameters can be overwritten with values set in *Fields Monitor* post-processing window by checking appropriate *Apply for* option: *3D FD-Monitors* or *2D FD-Monitors*.



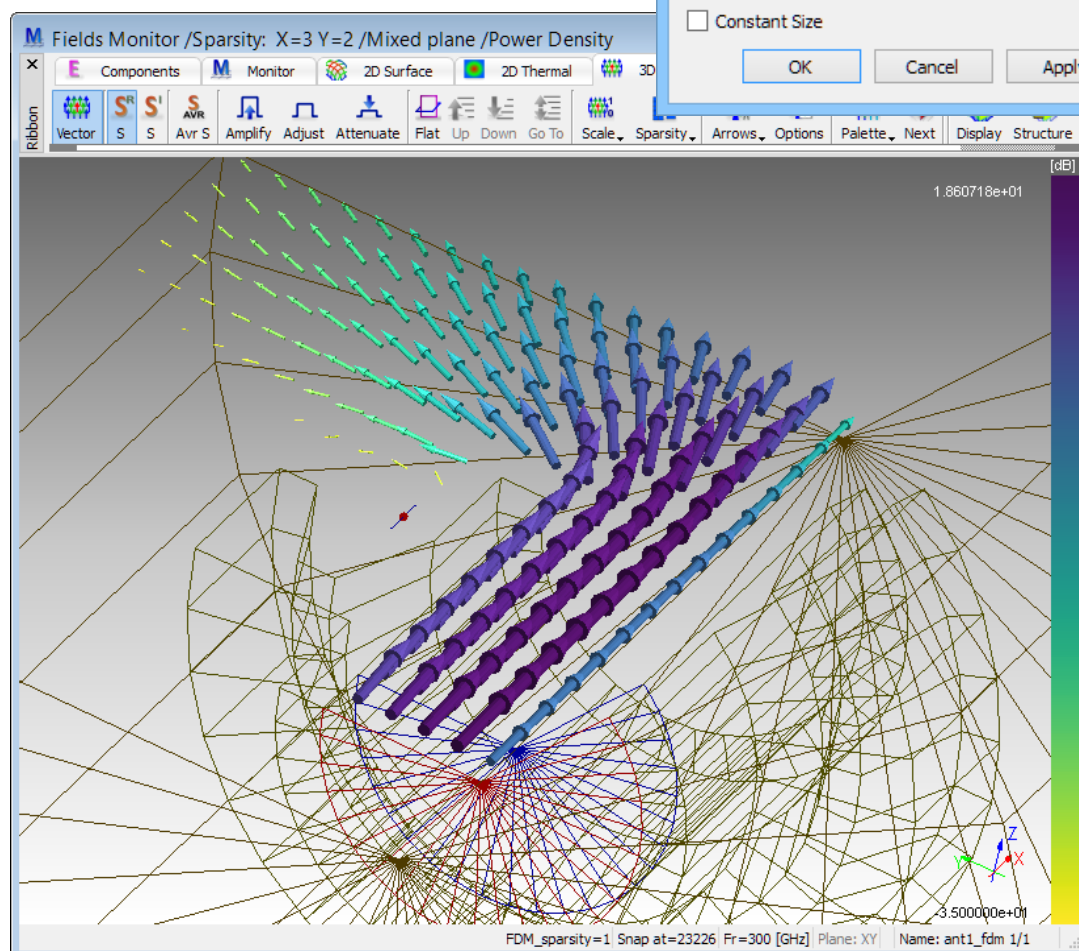
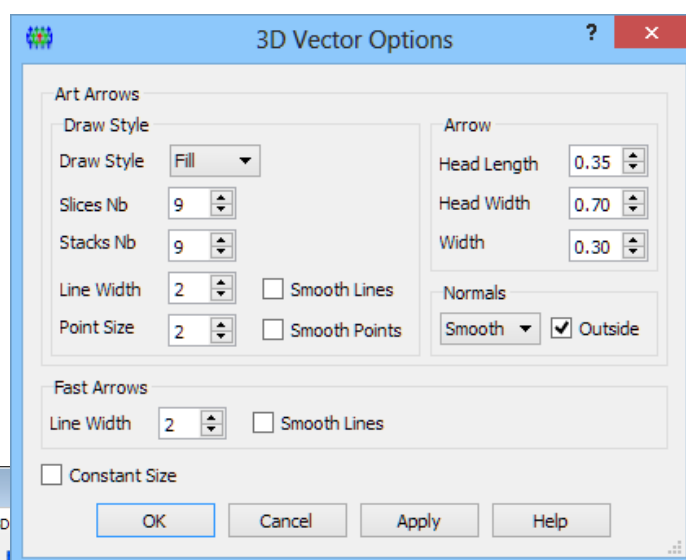
VOLUME SPARSITY FOR 3D VECTOR DISPLAY

The volume sparsity factor for displaying components in the 3D Vector display can be set separately for each direction.



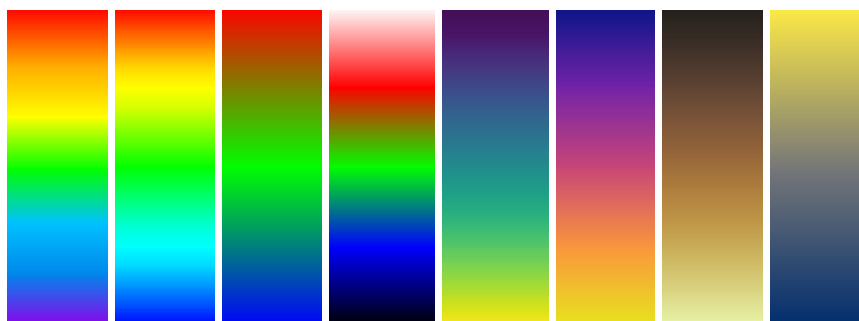
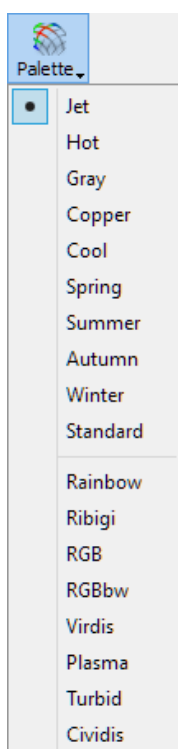
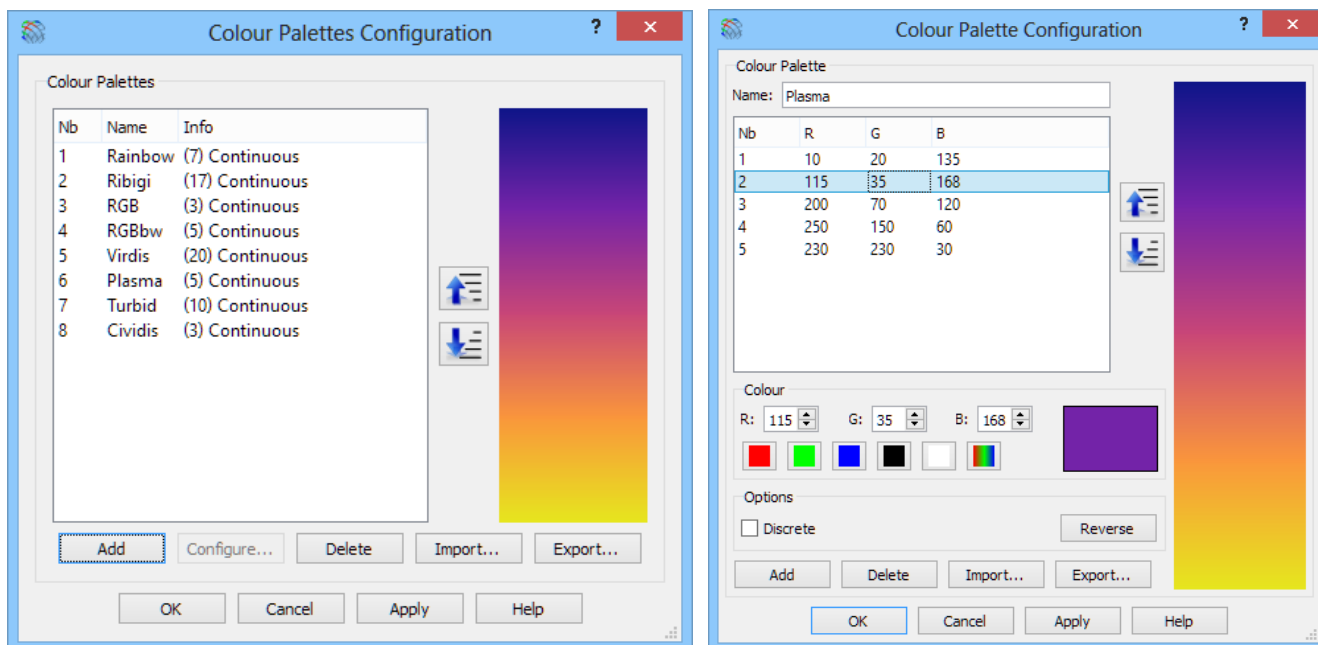
VECTOR 3D DISPLAY

The 3D Vector display is now equipped with additional options for displaying arrows. The visual drawing style and the dimensions of the arrow can be changed in 3D Vector Options dialogue.



USER DEFINED COLOUR PALETTES

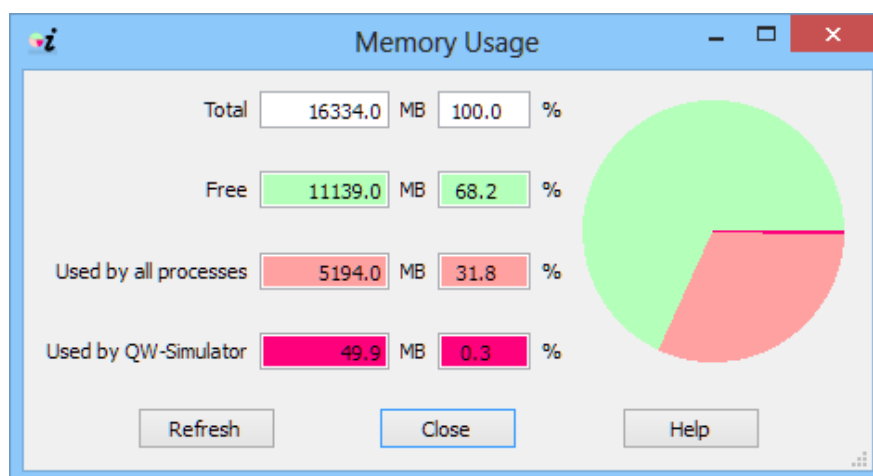
The possibility of defining and managing new colour palettes for fields displays is available. These colour palettes will be used for visualisation in 2D/3D Fields Distribution, Fields Monitor and 3D Radiation Pattern windows.



There are eight new predefined colour palettes.

MEMORY USAGE MONITORING

The *Memory Usage* dialogue allows monitoring the actual memory usage by QW-Editor and QW-Simulator.



OTHER

1. Acceleration of radiation pattern calculation (only user-selected NTF Frequency are considered) for optimisation with QW-OptimiserPlus.
2. New UDO commands *FDMLOCALFREQ*, *FDMLOCALSPARS*, *FDMLOCALCOMP* for setting Fields Monitor postprocessing parameters for each Field Monitor separately.
3. New visualisation regime in 2D/3D Fields Distribution, Fields Monitor, and 3D Radiation Pattern windows, using gradient instead of solid colour background.

SHORT-TERM LICENCES

Short-term licences involve time periods from 1 month to 6 months and are available for *QuickWave Professional* package, *QuickWave Standard* package, and all *QuickWave* optional modules. The new licences are protected with a software licencing procedure.

qwStore gives the possibility of getting quotation and purchasing short-term licence of your choice for *QuickWave* software.



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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