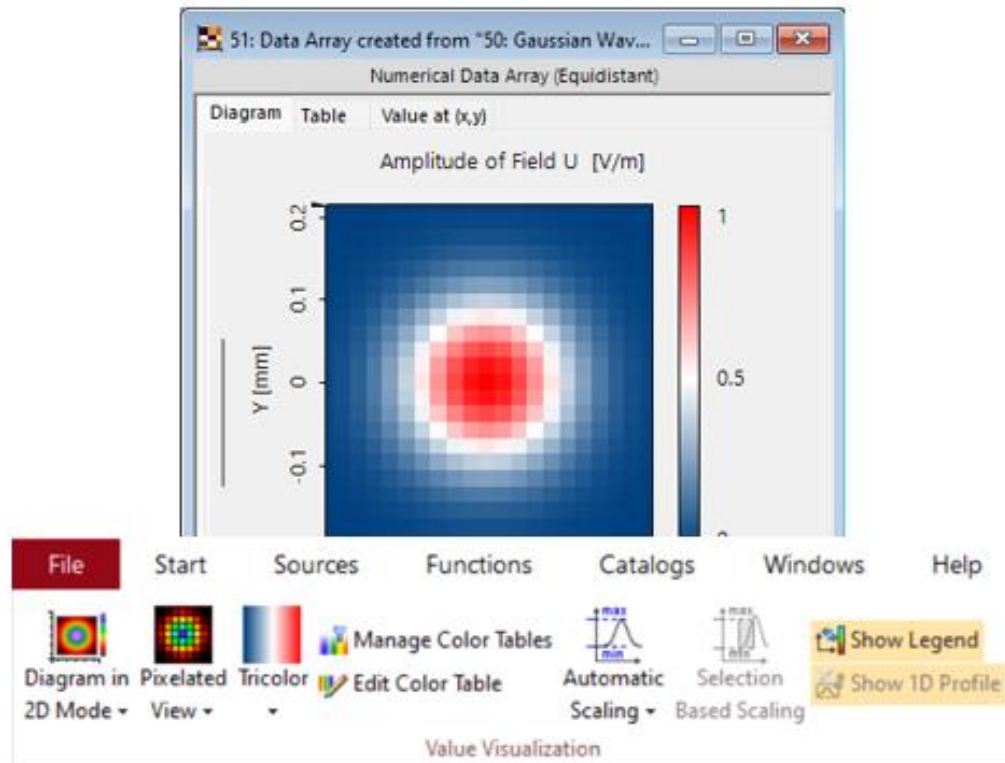


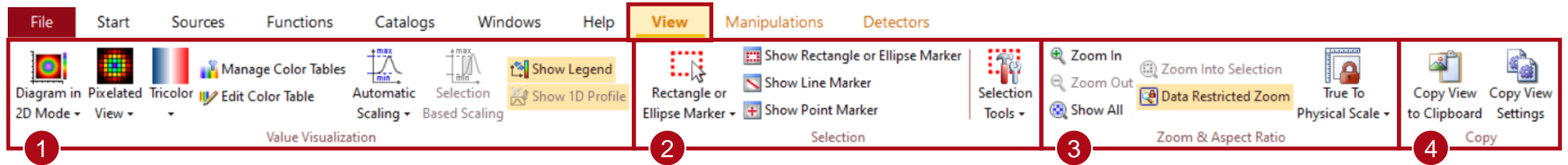
## **View Settings of 2D Data Arrays**

# Abstract



Data arrays are the most fundamental type of data in VirtualLab Fusion. As a generic data type, they are among the most flexible documents, offering a wealth of visualization and data manipulation options. As different kinds of data arrays are used in VirtualLab Fusion (e.g., 1D-, 2D-gridded and gridless data arrays), different visualization tools are available. In this document we will take an in-depth look at the visualization options of 2D Data Arrays and go through the corresponding View ribbon options in detail.

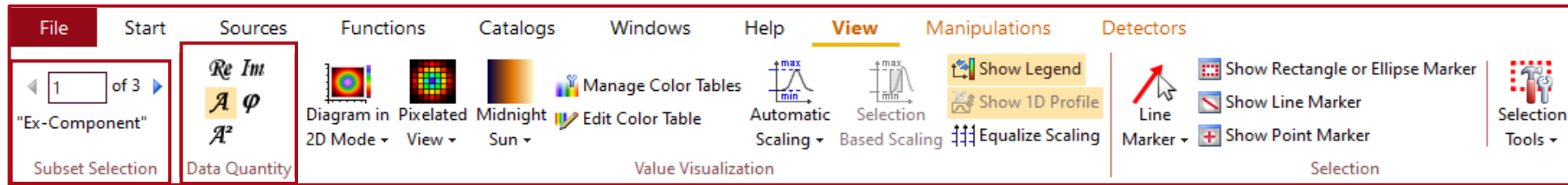
# Visualization Tools



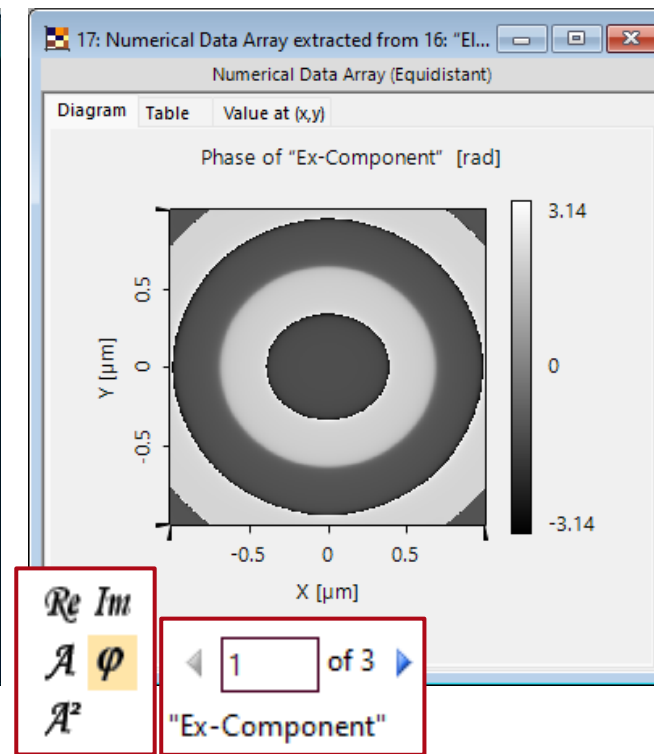
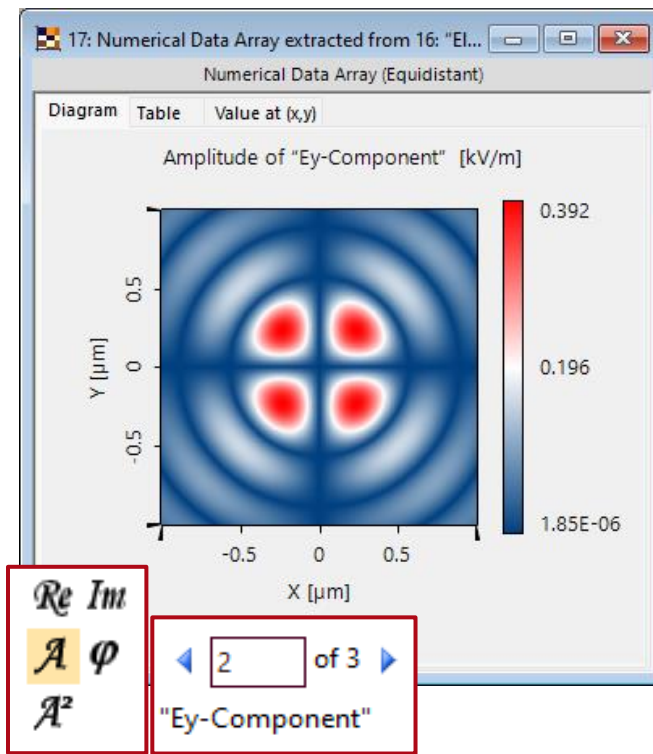
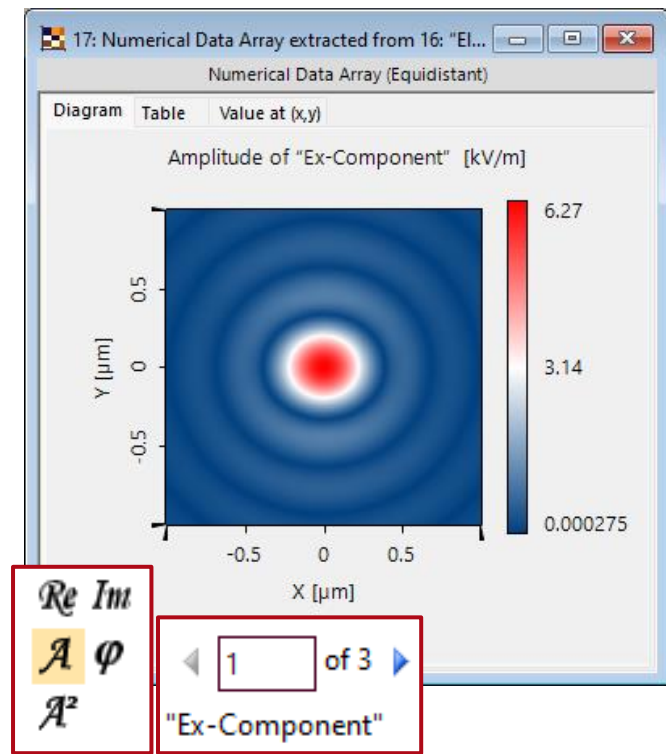
The *View* tab of the *Main Menu* ribbon allows for various customizations regarding the visual style of *Data Arrays*. The available tools are depending on whether the *Data Array* contains complex or real-valued data as well as the number of existing subsets. The following options are available throughout:

- 1 *Value Visualization*: Settings of view style, color table and scaling are offered.
- 2 *Selection*: This part comprises options to select or mark data inside an array.
- 3 *Zoom & Aspect Ratio*: Here, different option for zooming are available.
- 4 *Copy*: Allows the user to quickly copy the view settings from one *Data Array* to another.

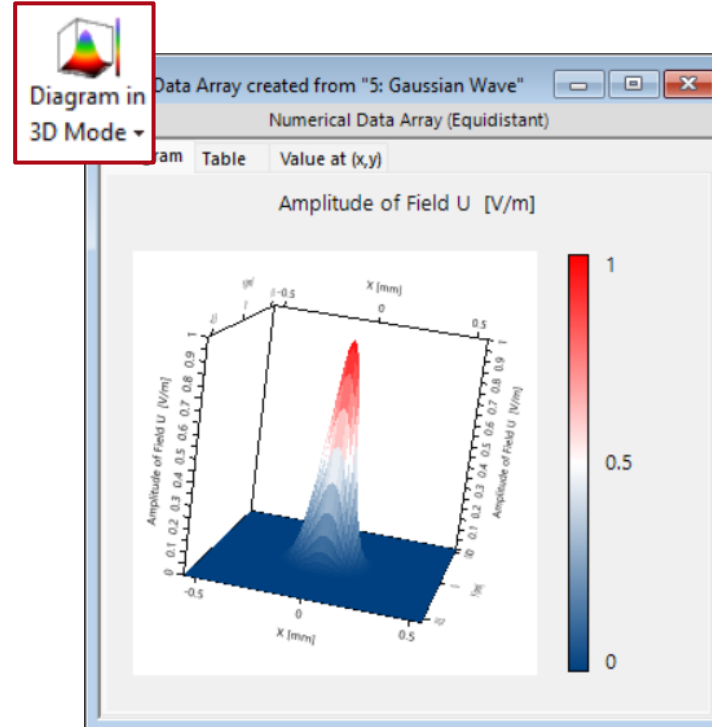
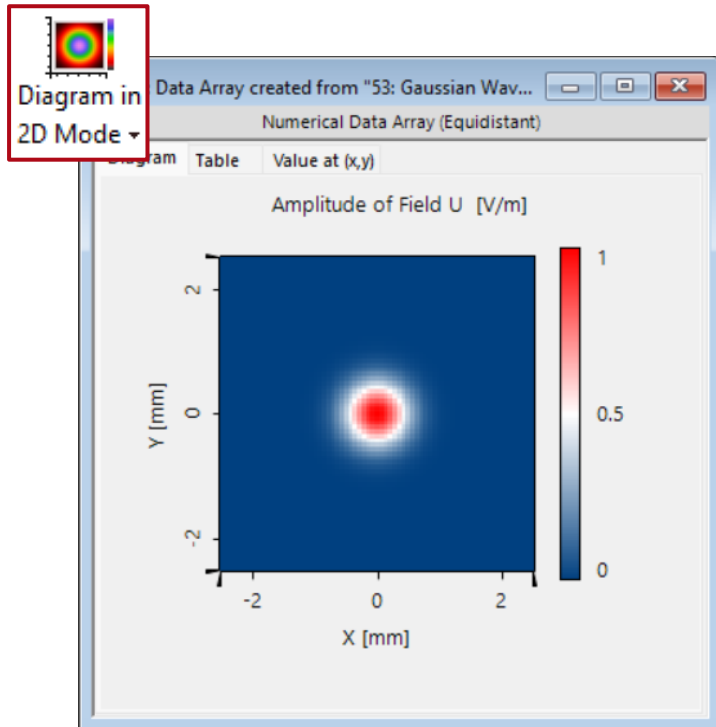
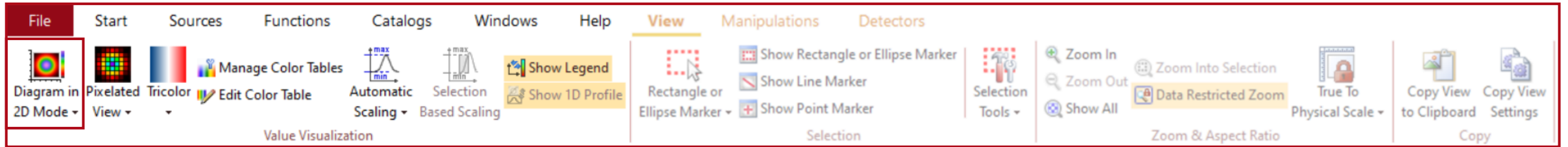
# Subset & Data Quantity Selection (for Complex/Mult. Subsets)



If an active *Data Array* comprises multiple subsets (wavelength modes, field components, ...), a new section appears in the *View* ribbon that allows you to switch through the individual subsets (*Subset Selection*). A similar section appears if the data is complex valued (*Data Quantity*).



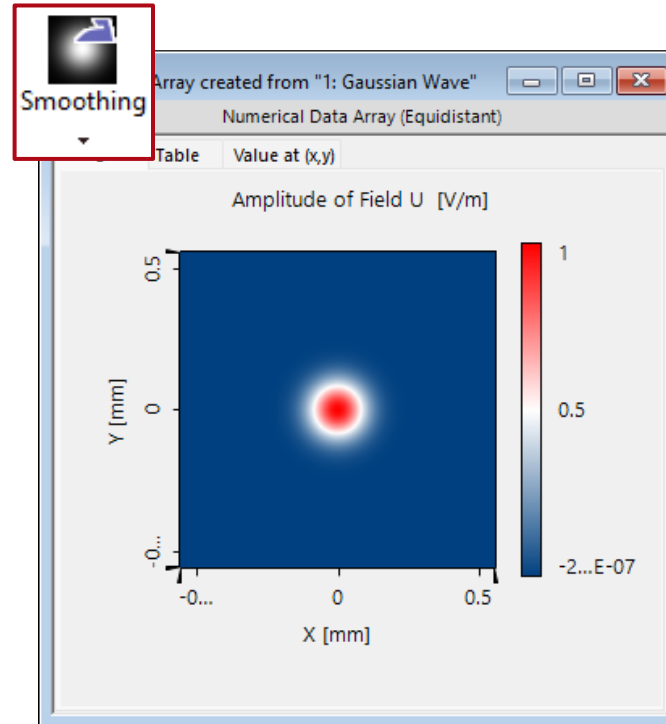
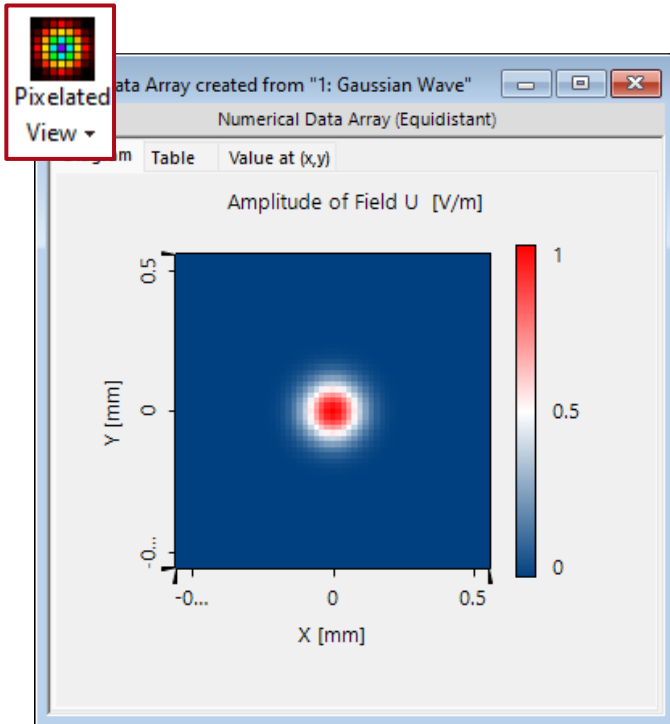
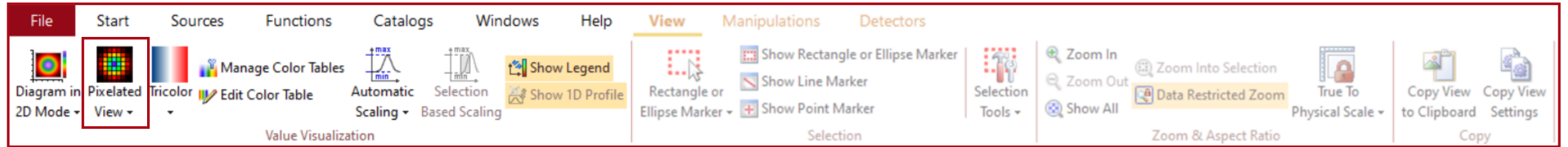
# 2D & 3D-Mode



With this tool, users can visualize the results in 3D. In 3D-mode:

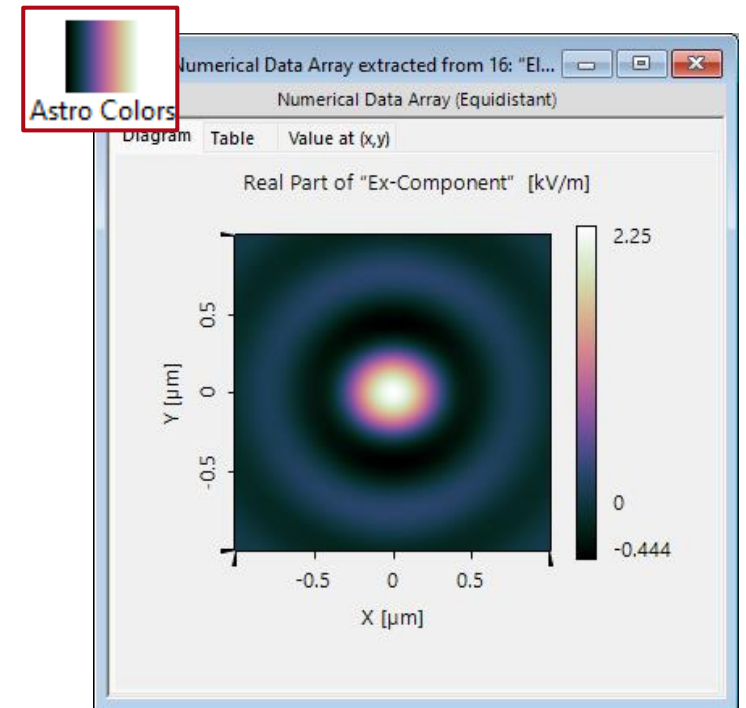
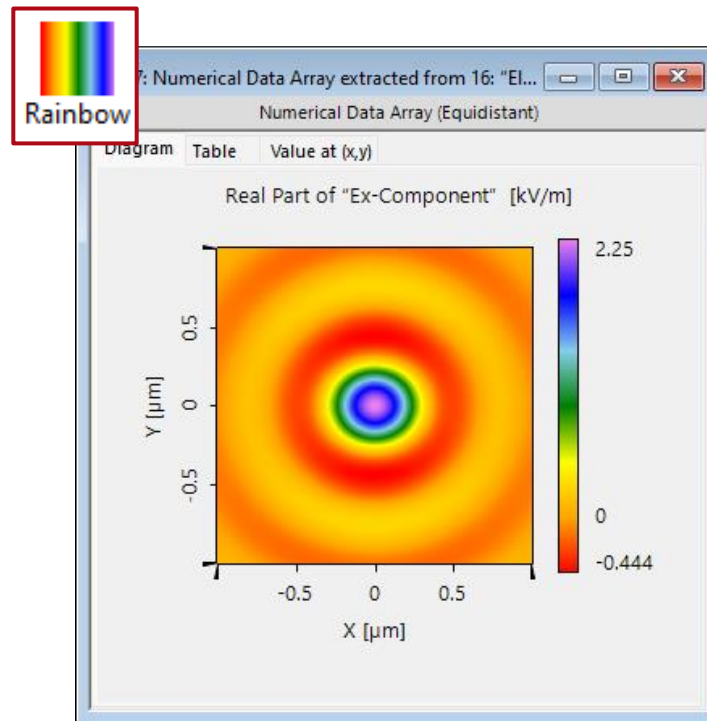
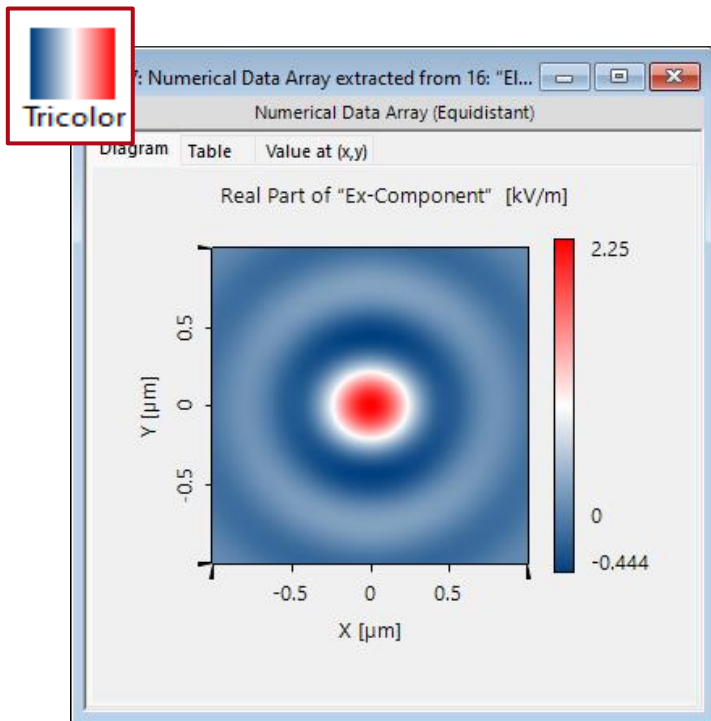
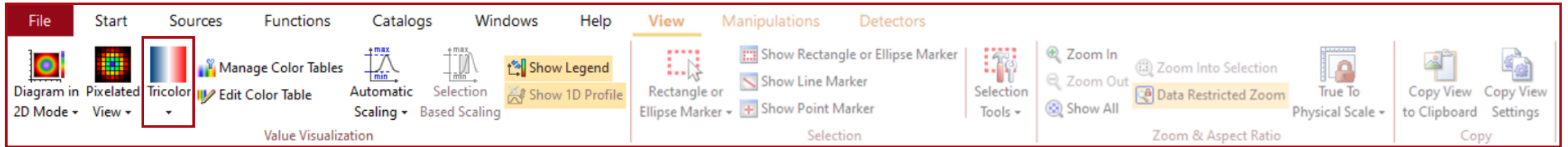
- press the left mouse button to rotate the view.
- press the left mouse button while holding the X/Y/Z-key to rotate around a specific axis.
- press the Shift-key and the left mouse button to shift the view laterally.

# Smoothing & Interpolation

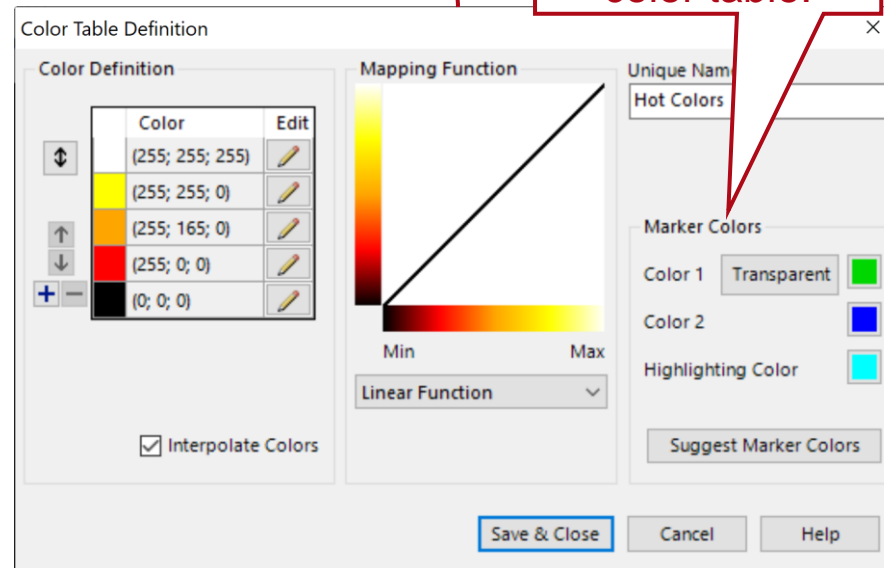
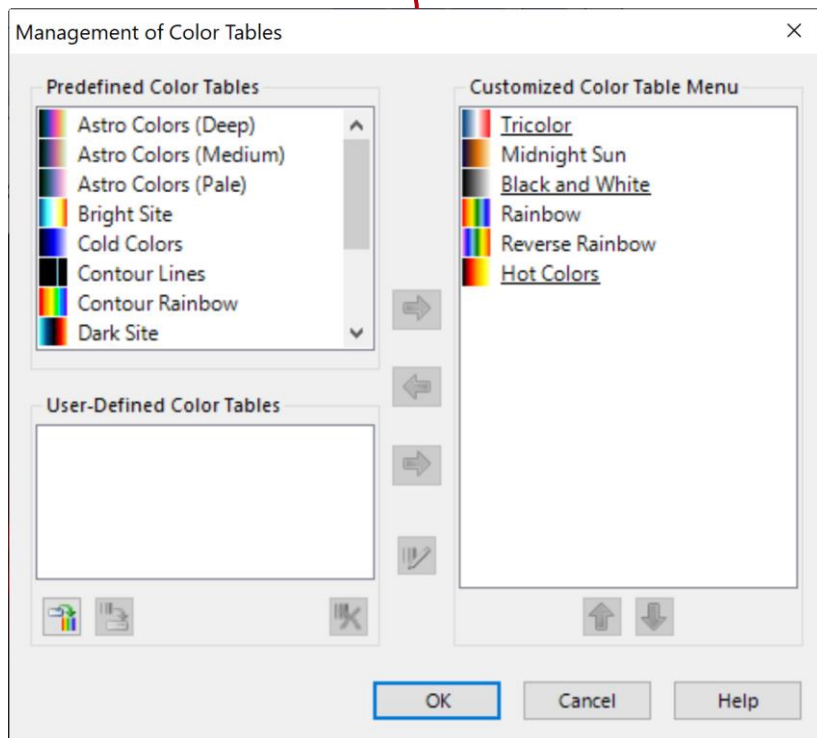
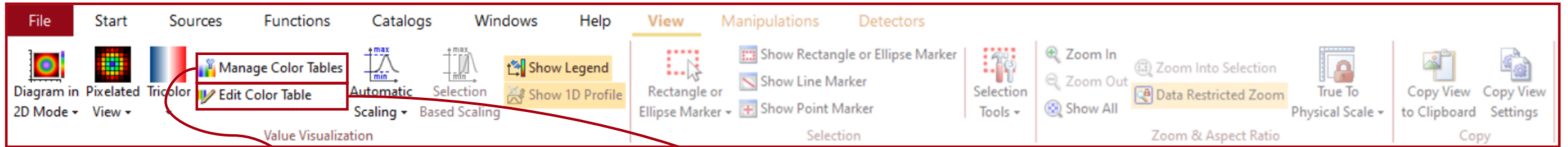


*Data Arrays* can be displayed with and without smoothing by clicking the *Pixelated View* button. Please note that this button only applies a specified interpolation algorithm onto the document. The applied interpolation technique can be modified in the *Manipulation* ribbon.

# Color Scheme



# Manage & Edit Color Schemes



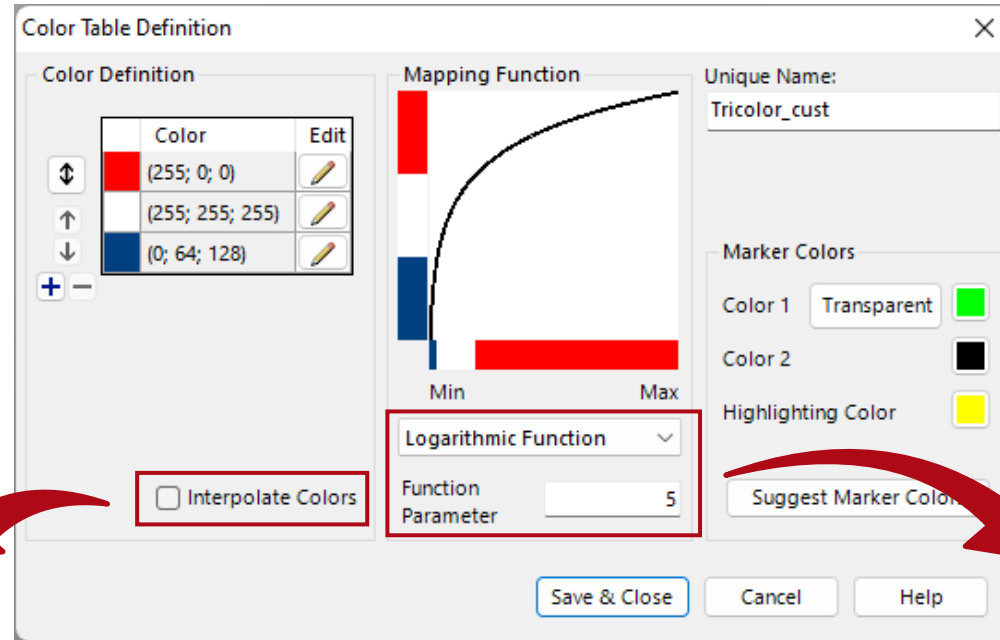
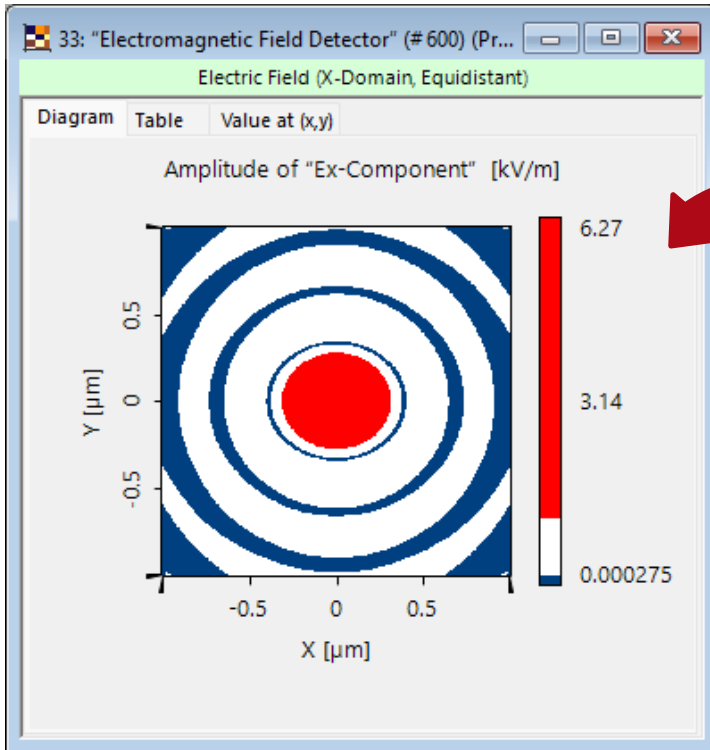
Marker Colors can also be defined per color table.

In the next section the user can choose between different color schemes for depicting 2D data. In addition, it is possible to customize the existing schemes or even define your own.

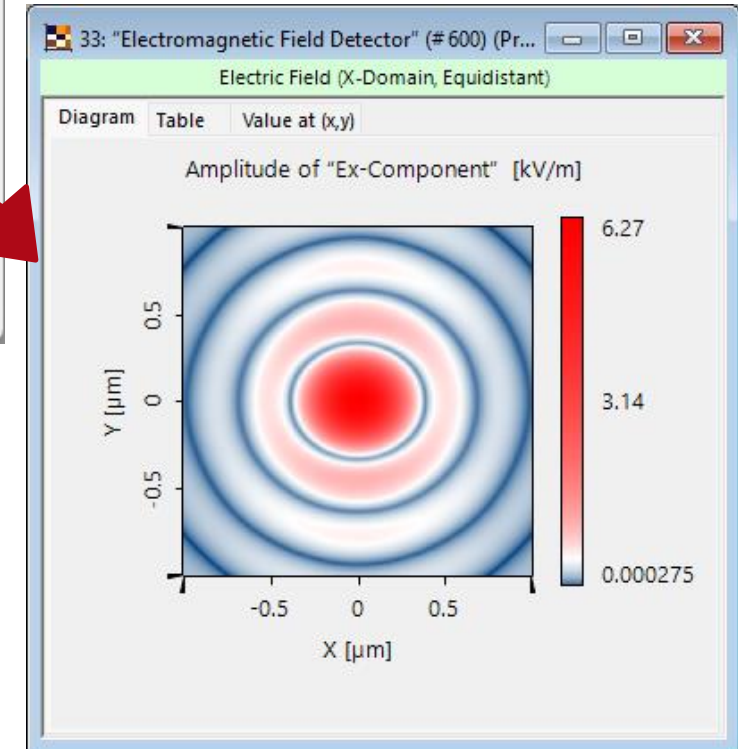


# Logarithmic & Exponential Color Tables

logarithmic, without interpolation

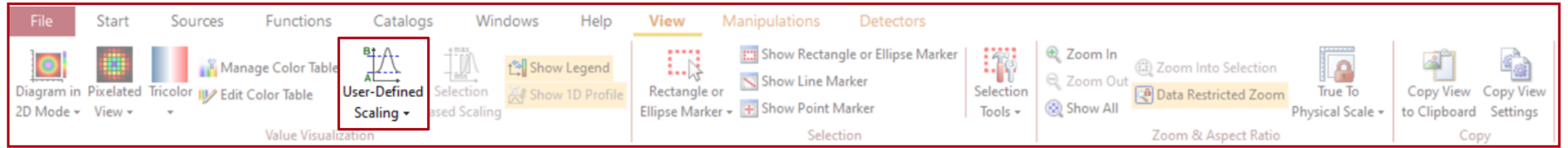


logarithmic



In case multiple orders of magnitude are of interest, logarithmic or exponential functions can be utilized in the color scheme of any color table. For a better visualization of contours, it is also possible to disable the interpolation between the defined colors.

# Scaling

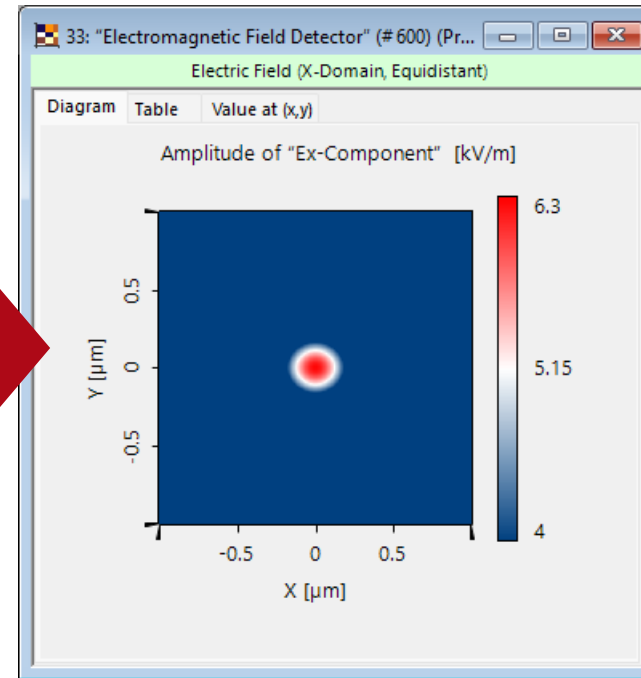
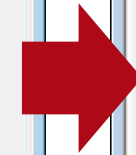
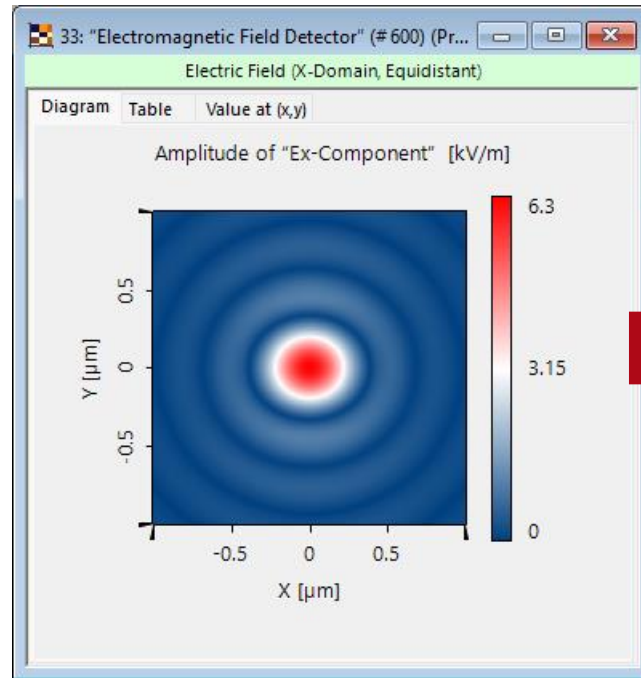


Property Browser

33: "Electromagnetic Field Detector" (# 600) (Profile: Ge...)

View Object Selections

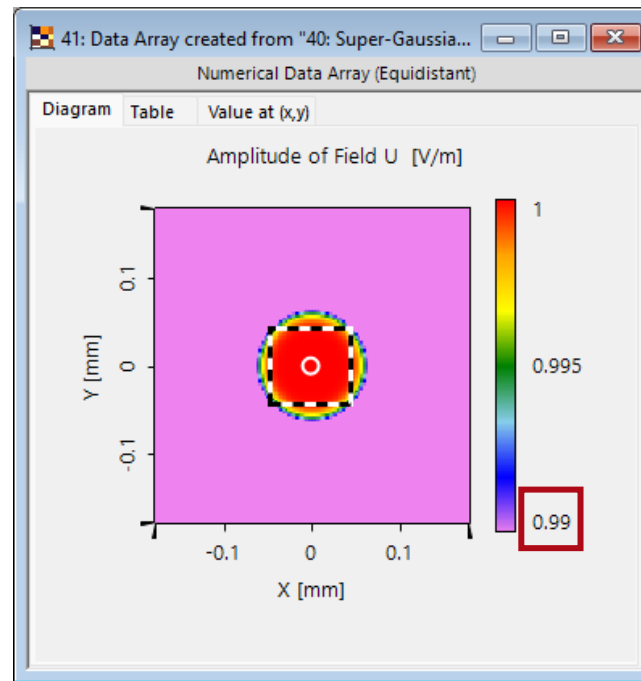
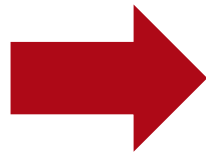
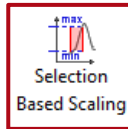
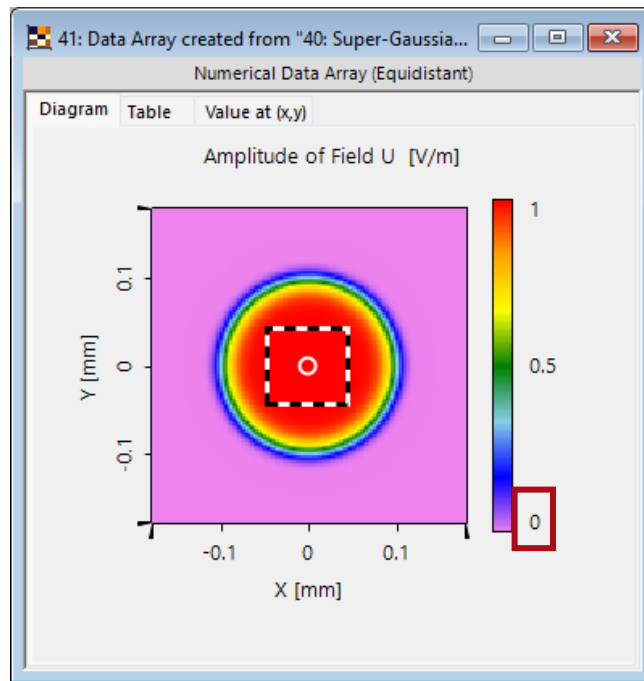
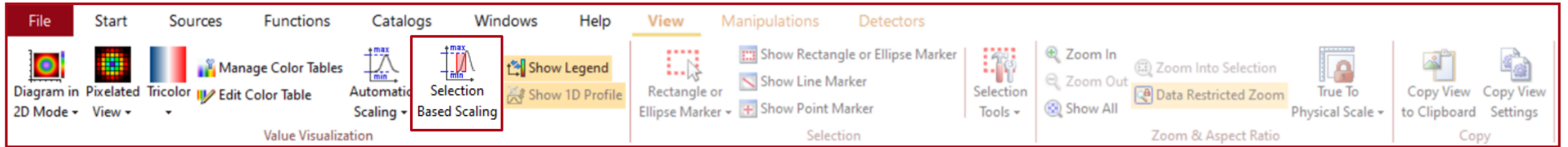
- General
  - Window Size: 400, 422
  - True To Scale: True
  - Data Restricted Zoom: True
  - Zoom Factor: 97.5
  - Zoom Factor Unit: 1 px / [1  $\mu\text{m}$ ]
- Colors
  - Color Table: Tricolor
- Data
  - Auto Scaling of Data: False
  - Displayed Data Range: [0 V/m; 6.3 kV/m]
  - Field Quantity: Amplitude
  - Format of Color Scale: Engineering
  - Subset Index: 1
  - View Interpolation: Pixelated View



By default, the shown data range will be determined automatically by the min. and max. value. With the *User-Defined Scaling* setting, the user can modify the displayed data range in the *Property Browser*.

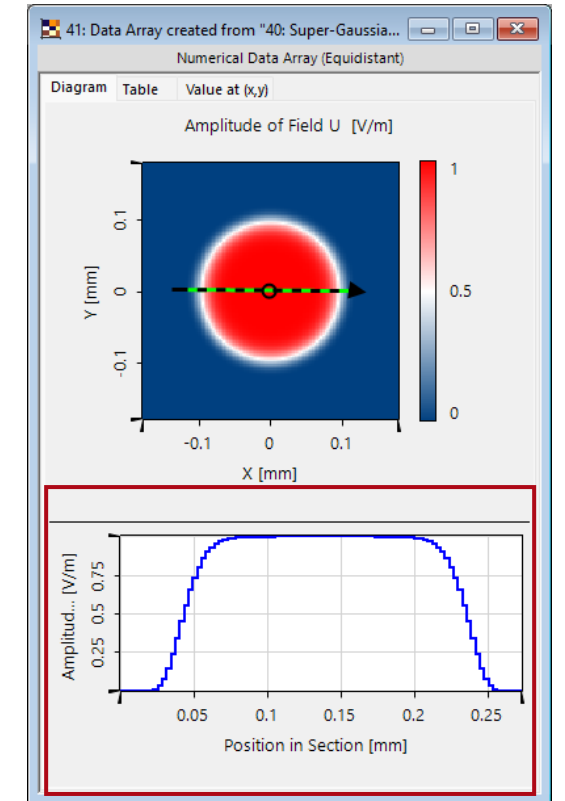
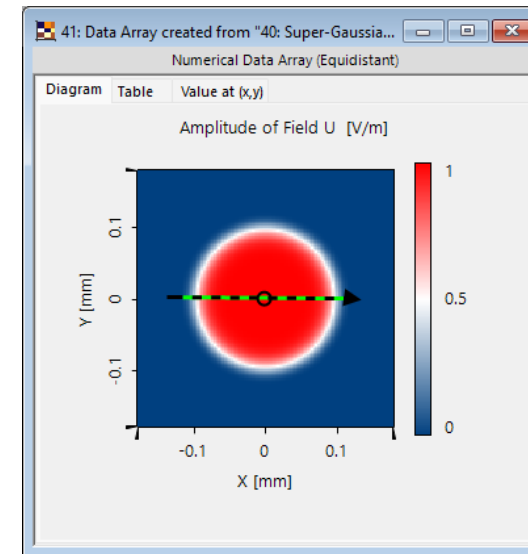
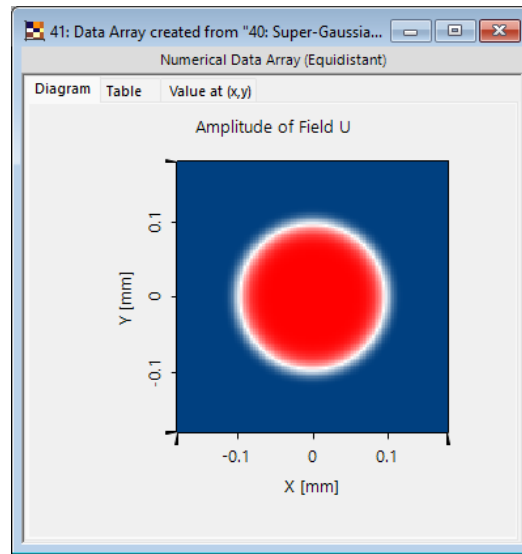
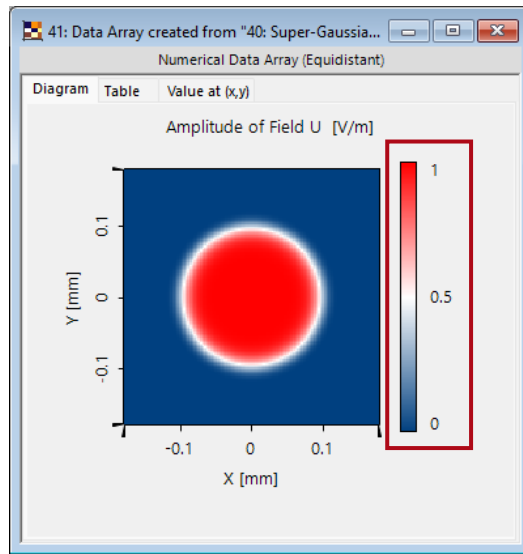
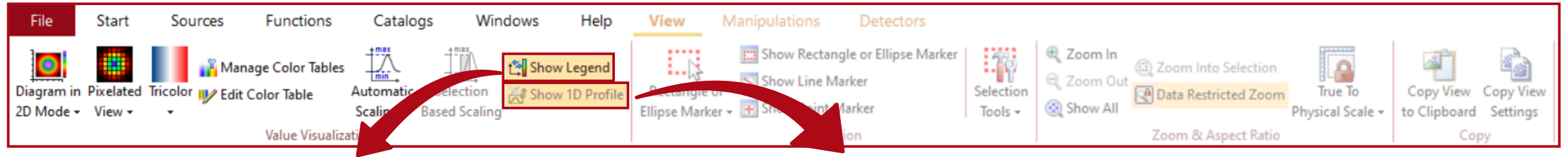
Displayed Data Range [0 V/m; 6.3 kV/m]    Displayed Data Range [4 kV/m; 6.3 kV/m]

# Selection Based Scaling Tool



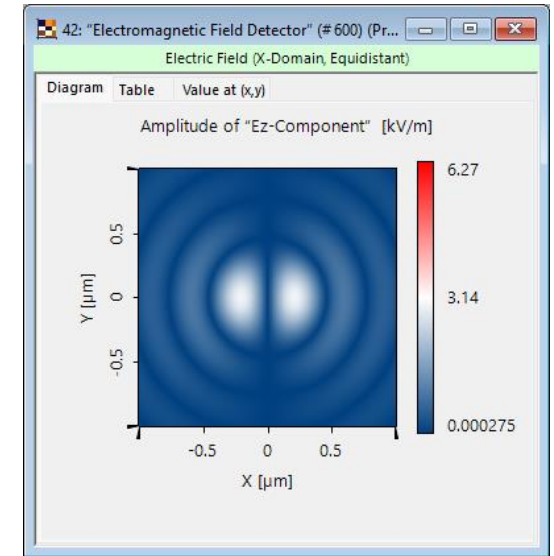
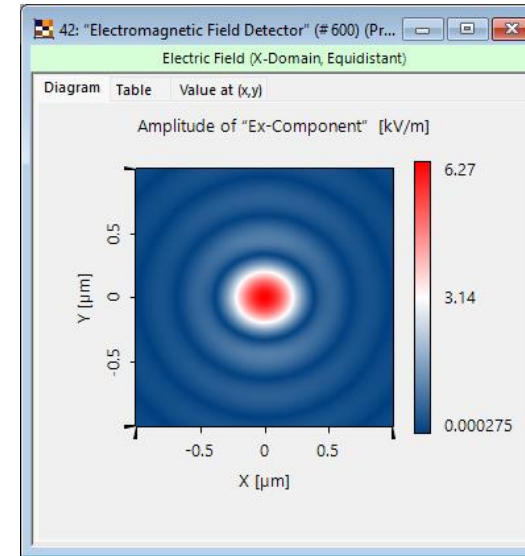
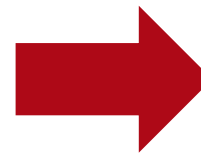
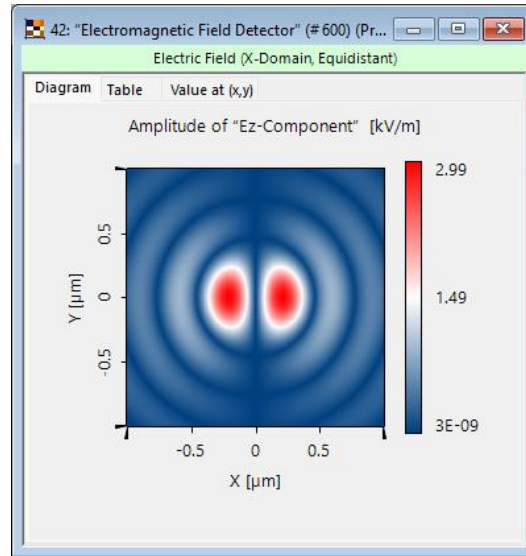
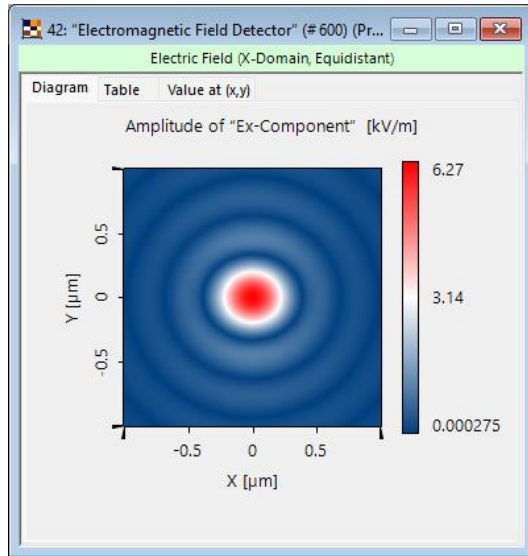
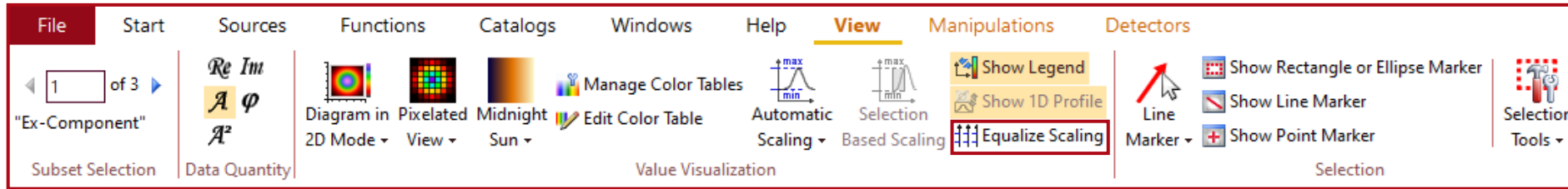
If parts of the data are selected by a *Rectangle or Ellipse Marker*, the *Selection Based Scaling* option can be used to change the scaling according to the minimum and maximum value within the selection.

# Legend & 1D Profile



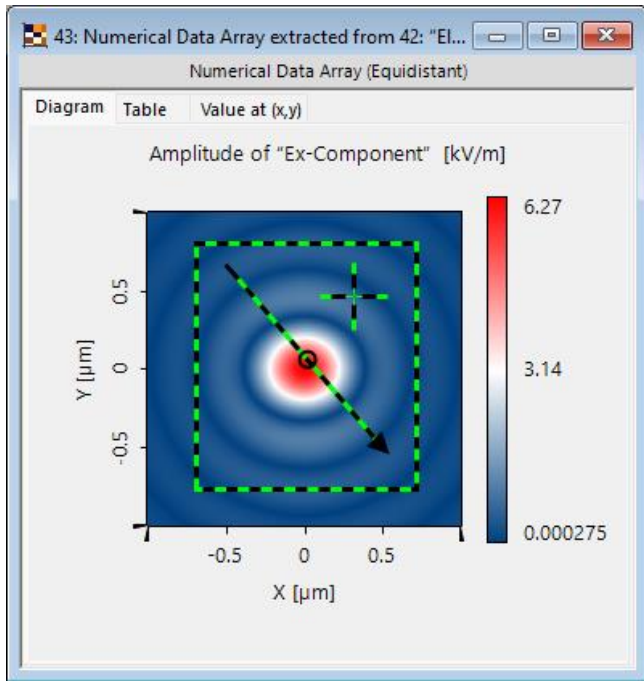
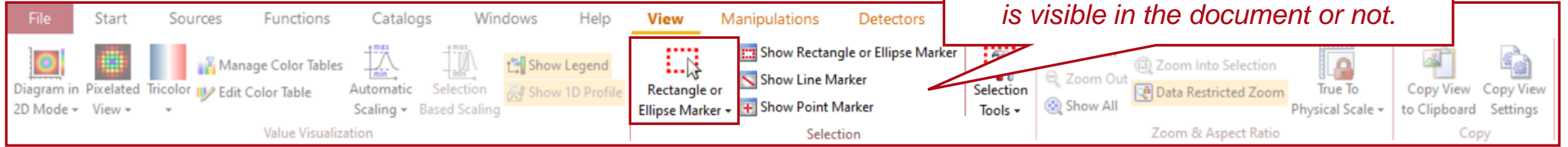
Additional GUI features, such as display of the legend and 1D profile along a line marker can be switched on or off.

# Equalize Scaling (for Multiple Subset)



By default, if the *Data Array* contains multiple subsets, the scaling will be determined for each subset individually. The *Equalize Scaling* option automatically adjust the scaling of all subsets according to the current one.

# Markers – Selection of Data

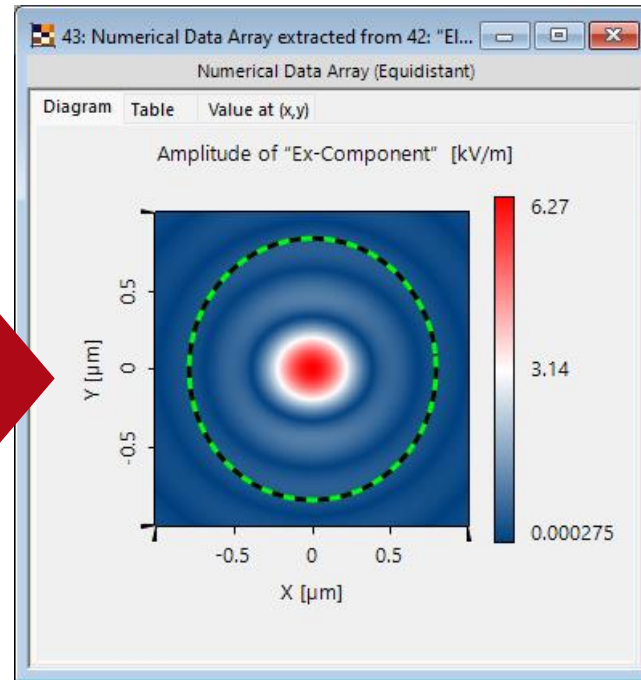
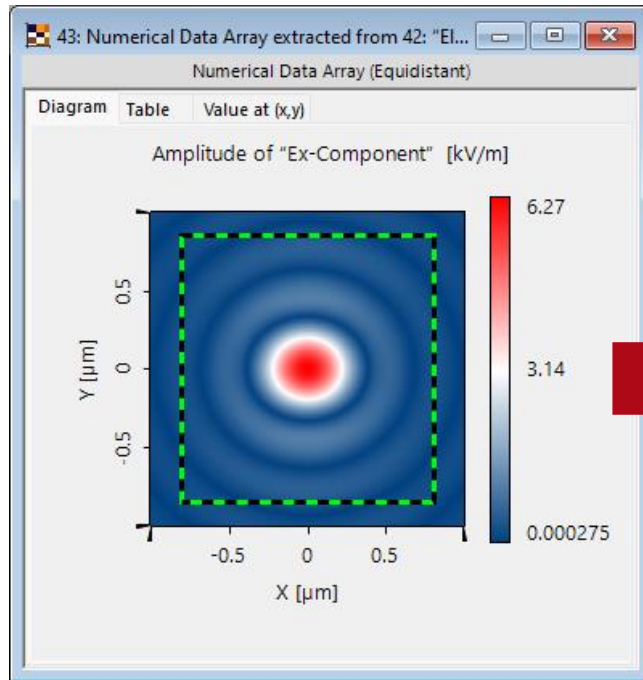
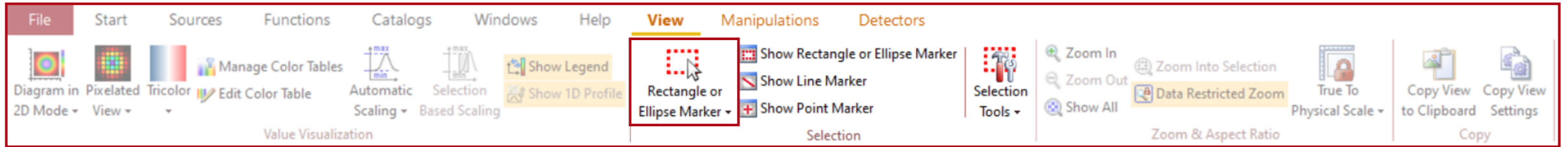


VirtualLab Fusion offers three different selection tools, such as selecting a specific point, line or region within the *Data Array*. Some tools in the *View* and *Manipulations* ribbon require an active marker to be available.

Detailed information about the markers and coordinates can be found and adjusted in the *Property Browser!*

<ul style="list-style-type: none"> <li>Selection (Line)           <ul style="list-style-type: none"> <li>Display Line Marker <b>True</b></li> <li>Start Coordinates <b>(-505.86 nm; 669.92 nm)</b></li> <li>End Coordinates <b>(537.11 nm; -537.11 nm)</b></li> <li>Length <b>1.5952 μm</b></li> <li>Start Indices <b>(126; 427)</b></li> <li>End Indices <b>(393; 118)</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Selection (Point)           <ul style="list-style-type: none"> <li>Display Point Marker <b>True</b></li> <li>Point Coordinates <b>(314.45 nm; 466.8 nm)</b></li> <li>Point Indices <b>(336; 375)</b></li> <li>Value (Real Part) at Point <b>-202.83 V/m</b></li> <li>Value (Imaginary Part) at <b>570.29 V/m</b></li> <li>Value (Amplitude) at Poi <b>605.29 V/m</b></li> <li>Value (Phase) at Point <b>1.9125 rad</b></li> <li>Value (Squared Amplitud <b>3.6637E+05 (V/m)<sup>2</sup></b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>Selection (Region)           <ul style="list-style-type: none"> <li>Show Rectangle or Ellips <b>True</b></li> <li>Elliptic Selection <b>False</b></li> <li>Data Point Indices of Lov <b>(79; 60)</b></li> <li>Data Point Indices of Up <b>(437; 461)</b></li> <li>Rectangle ((Left, Bottom) (LB, RT) = <b>(-691.41 nm, -765.63</b></li> </ul> </li> </ul>

# Rectangle and Ellipse Marker



Property Browser

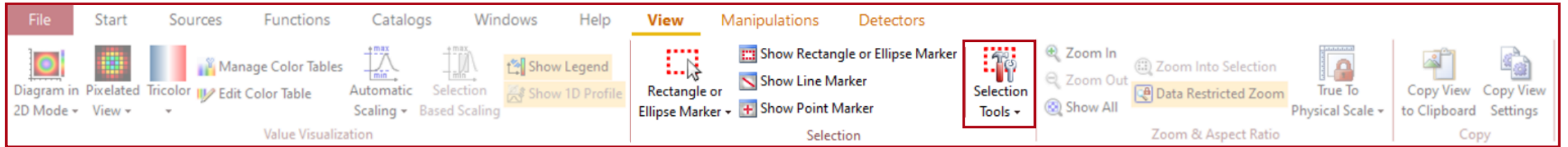
43: Numerical Data Array extracted from 42: "Electroma..."

View Object Selections

- Selection (General)
  - Coordinate Snapping Se **True**
  - Selection Mode **Point**
- Selection (Line)
  - Display Line Marker **False**
- Selection (Point)
  - Display Point Marker **False**
- Selection (Region)
  - Show Rectangle or Ellips **True**
  - Elliptic Selection **False**
  - > Data Point Indices of Lov (50; 39)
  - > Data Point Indices of Up (462; 473)
  - > Rectangle ((Left, Bottom) (LB, RT) = (-804.69 nm, -847.66

The selection of a region can be switched from rectangular to elliptic in the *Property Browser*.

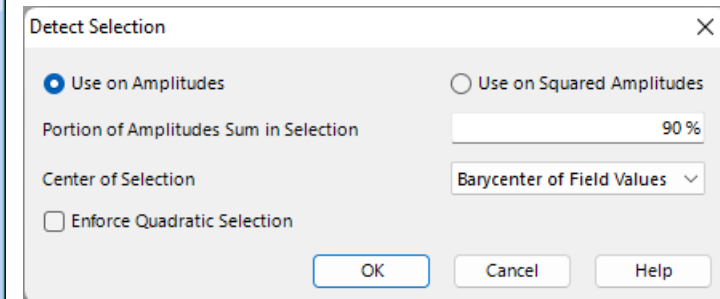
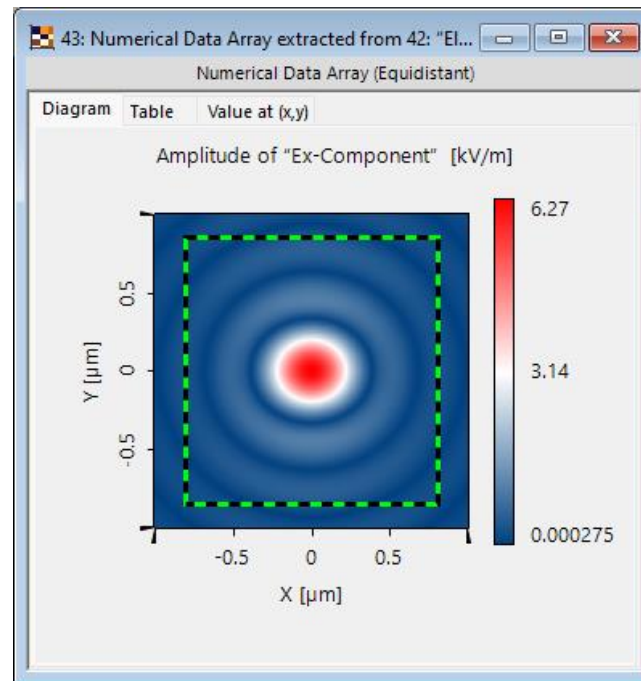
# Rectangle and Ellipse Marker



In addition, for *Rectangle or Ellipse Marker* there is a selection of tools available to quickly detect a specific region or move an already existing marker.

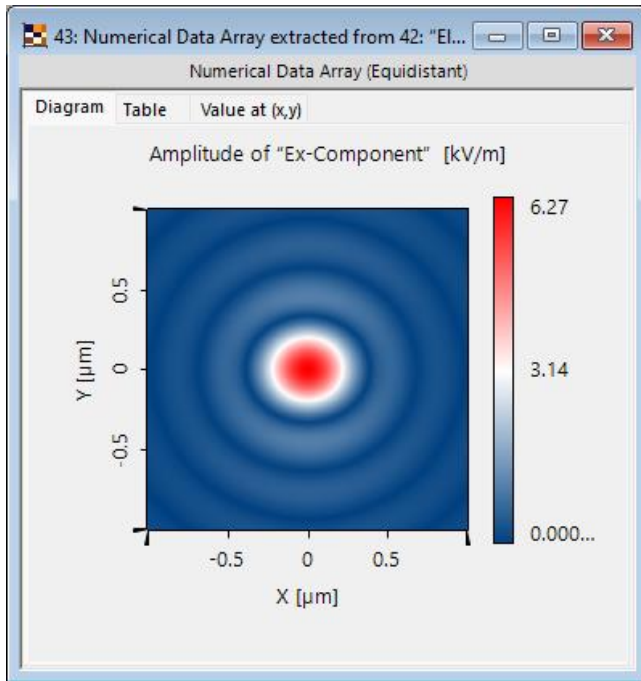
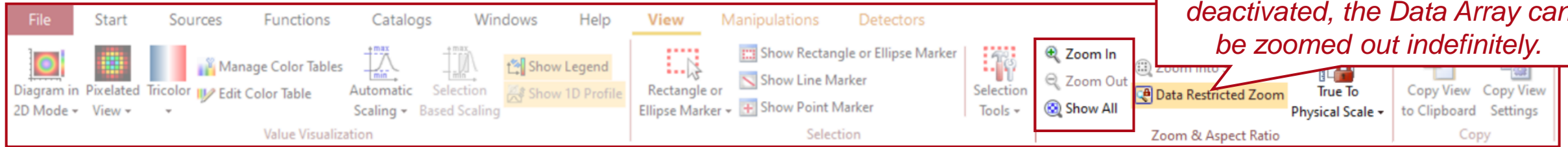
The available tools are:

- select the entire window
- select region that corresponds to a pre-defined portion of the amplitude sum or squared amplitude sum
- move marker to origin
- copy marker from another window

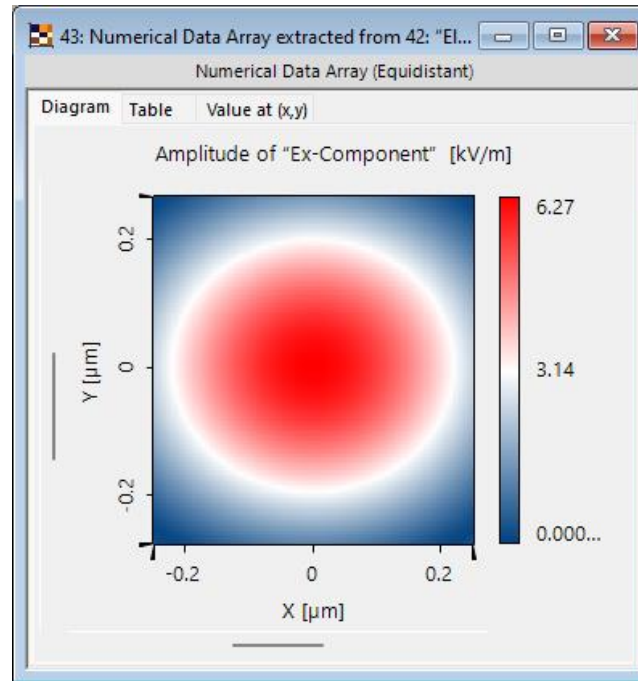




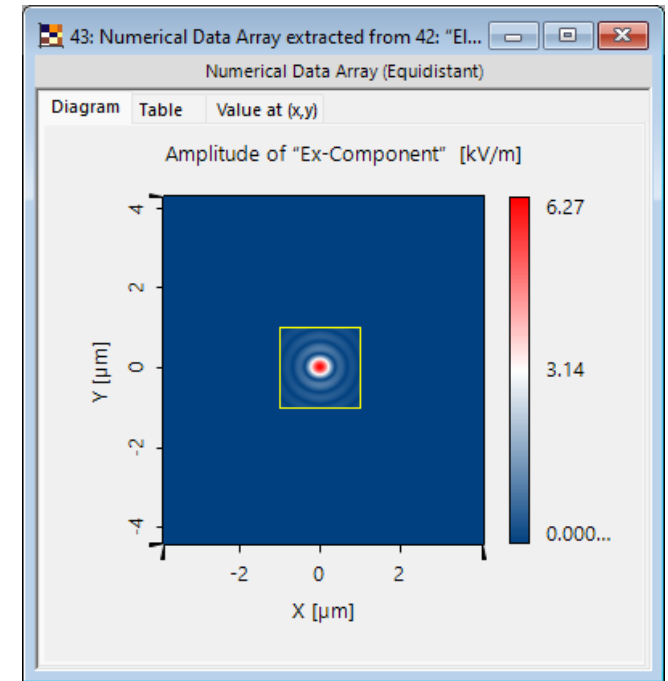
# Zoom Options



original window

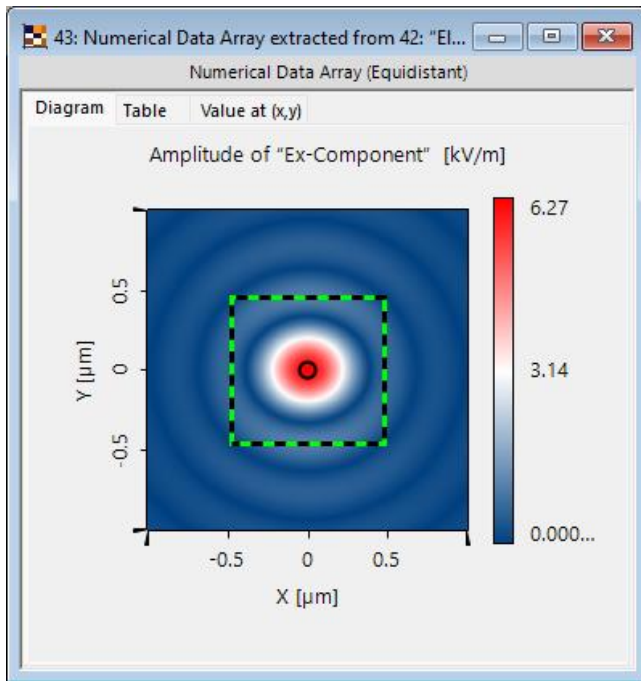
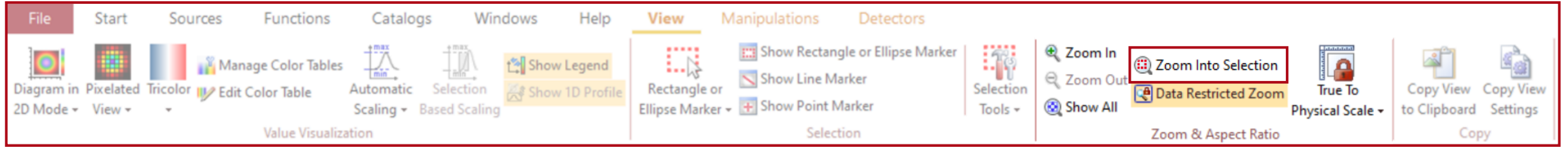


zoomed in

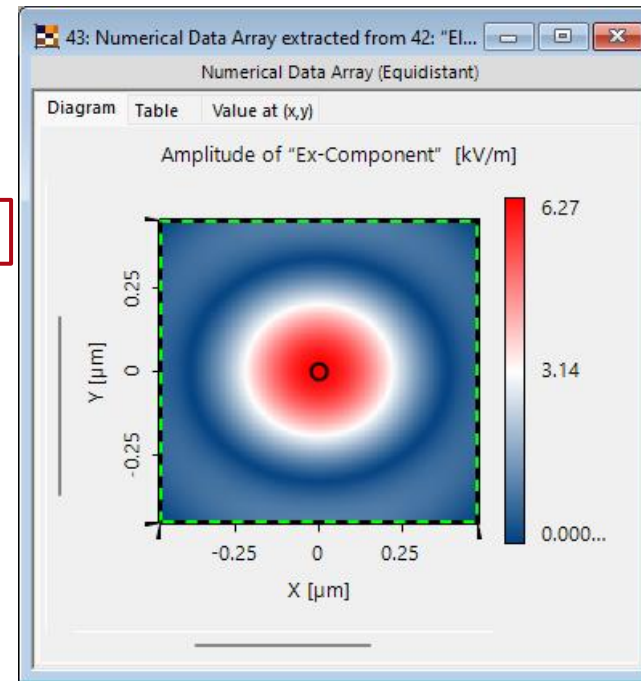
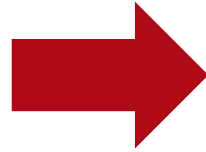


zoomed out

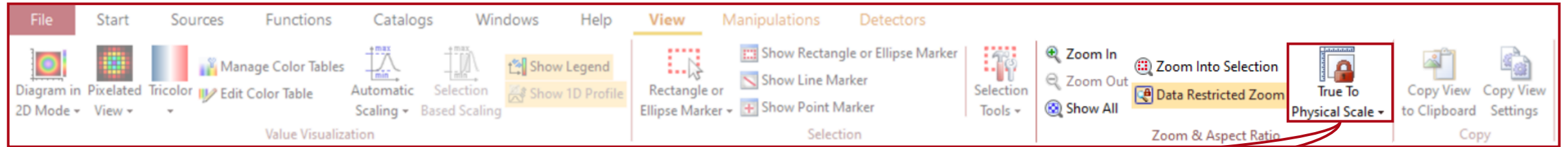
# Zoom into Selection



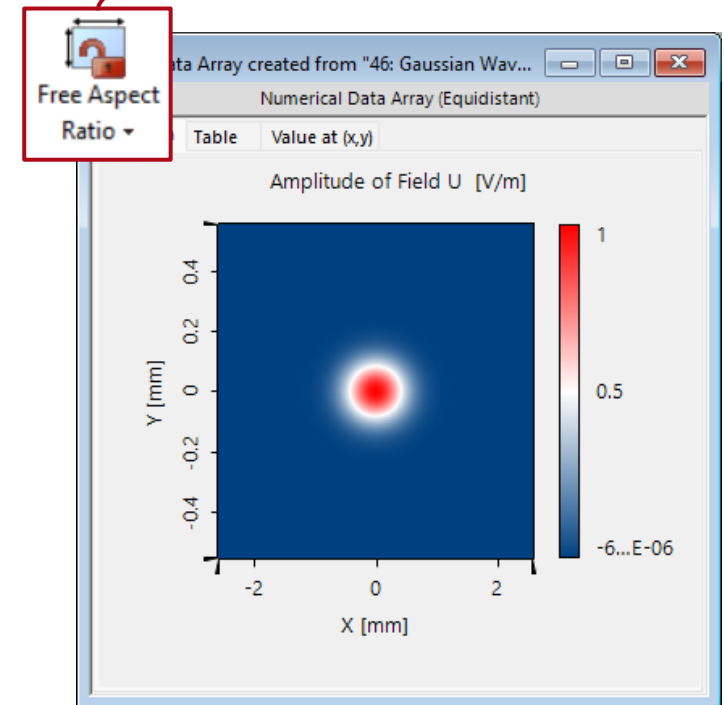
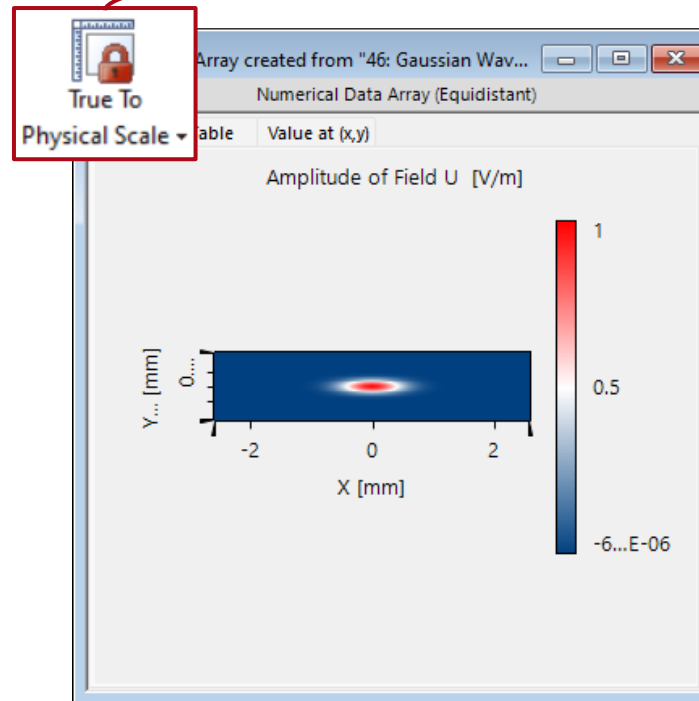
Zoom Into Selection



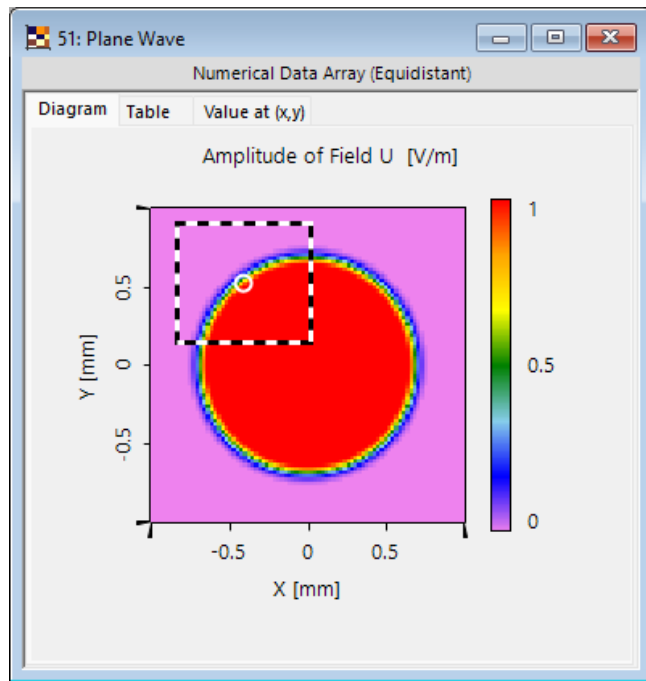
# Lateral Scaling



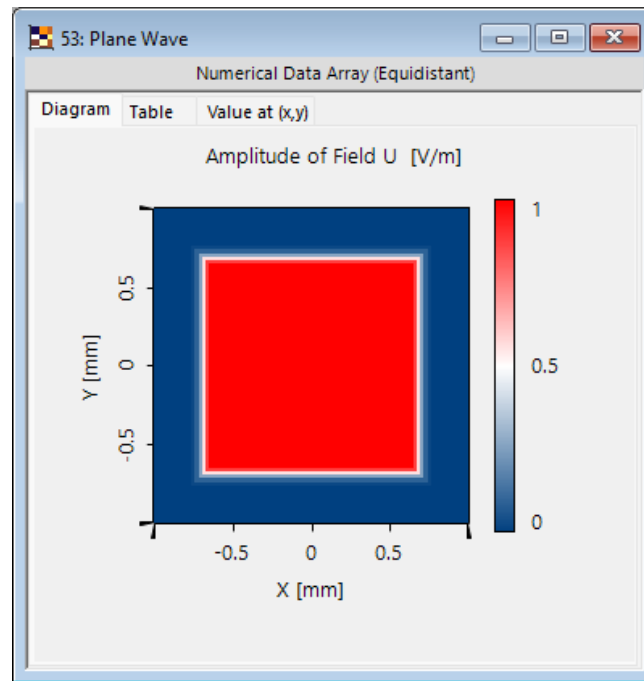
By default, *Data Arrays* are visualized with the same scaling on both axis, meaning that i.e., 1 mm on the x-axis has the same length as 1 mm on the y-axis. This can be changed by selecting *Free Aspect Ratio* in the *View* tab.



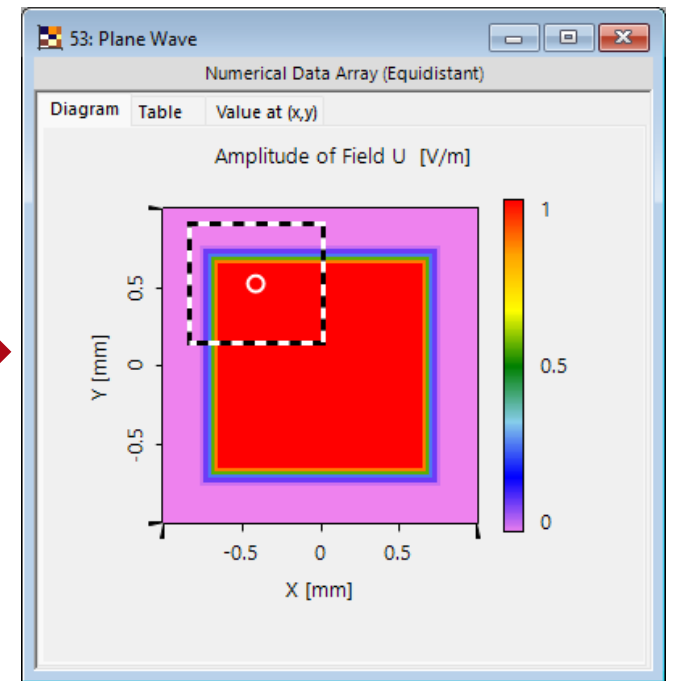
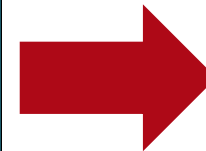
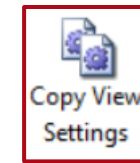
# Copy View Settings



reference



before copying



after copying

# Document Information

---

title	View Settings of 2D Data Array
document code	SWF.0024
document version	1.0
software edition	VirtualLab Fusion Basic
software version	2022.1 (Build 1.554)
category	Feature Use Case
further reading	