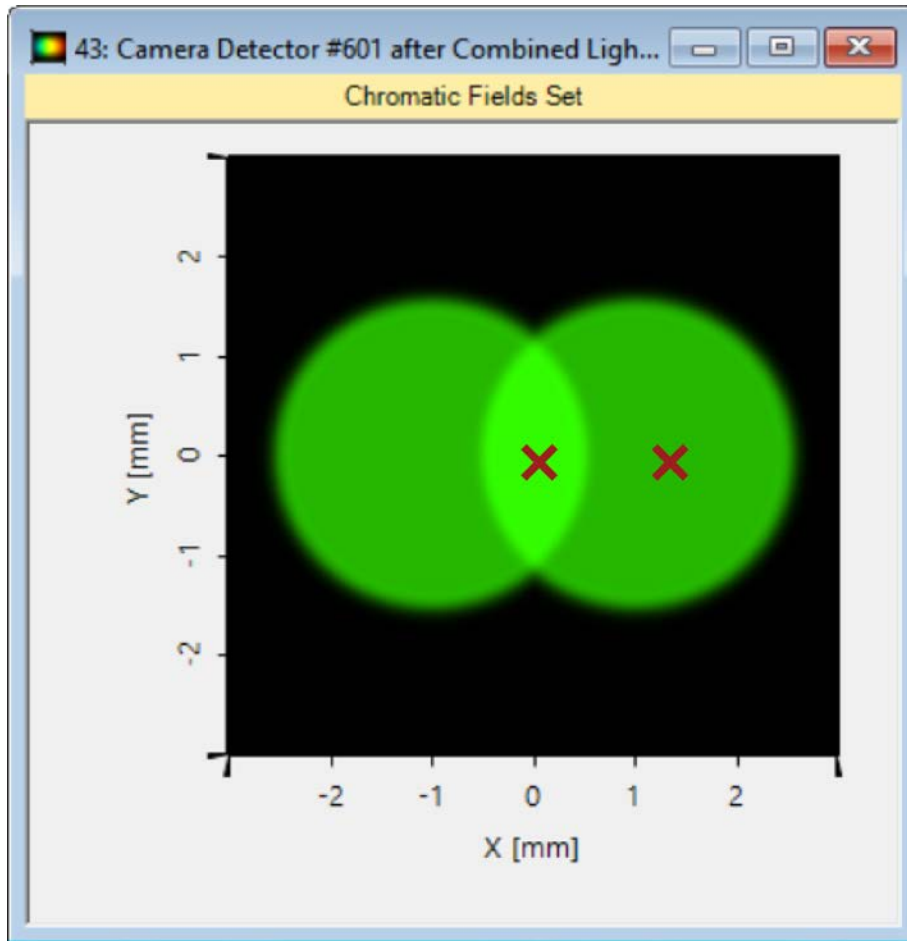


# Programming a Degree of Coherence Detector

# Abstract



The electromagnetic field on any plane, with arbitrary coherent property, can be decomposed into coherent and mutually uncorrelated modes. In VirtualLab Fusion, one can always access the fully vectorial electromagnetic fields, and by means of the Programmable Detector, one can calculate the degree of coherence on the detector plane according to its definition. This example shows the calculation of the complex degree of coherence for  $E_x$  and  $E_y$  respectively.

# Task Description & Result

## Task:

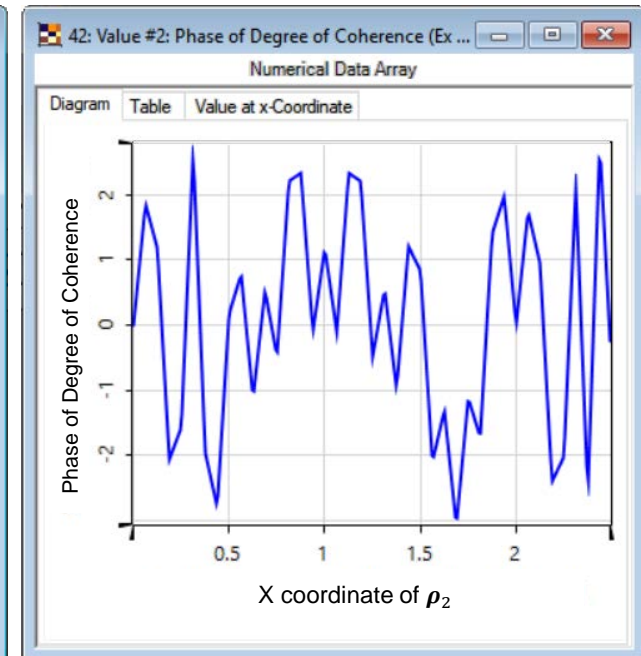
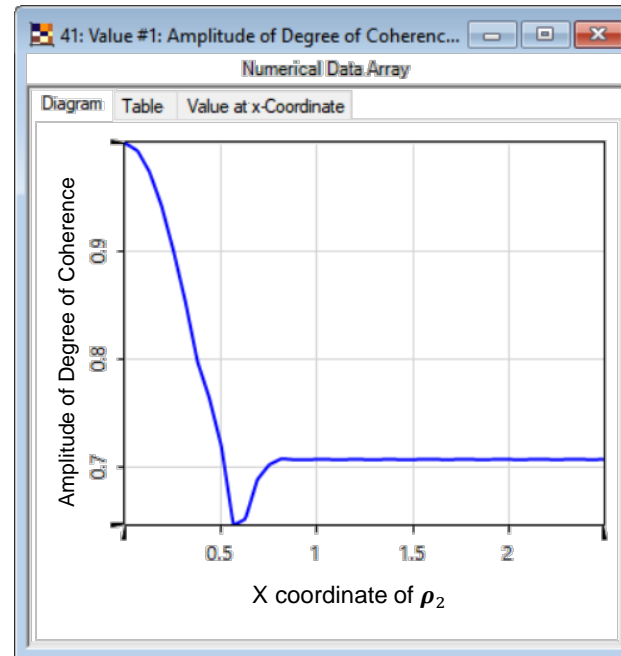
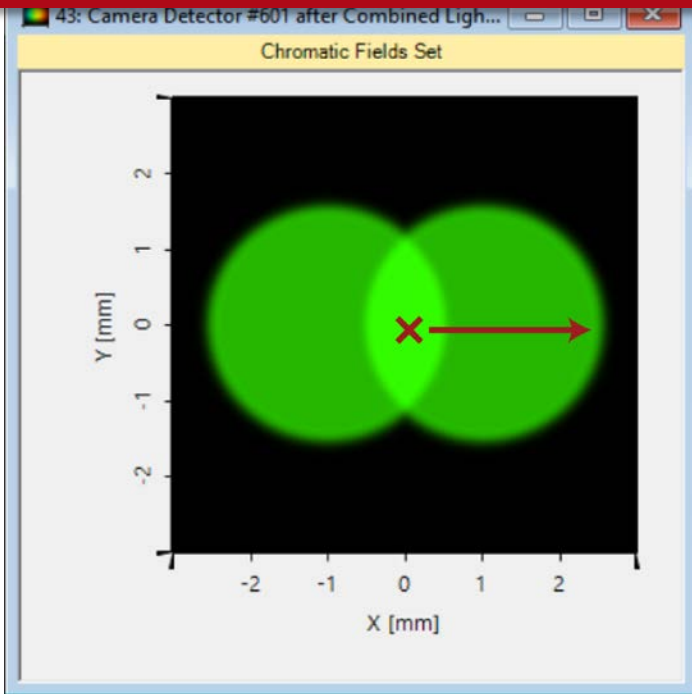
Calculate the complex degree of coherence of the field between two different positions.

For  $\rho_1=(0, 0)$  and  $\rho_2=(x, 0)$ .

The complex degree of coherence is given by:

$$\mu(\rho_1, \rho_2; \omega) = \frac{\sum_{n=1}^N V_n^*(\rho_1) V_n(\rho_2)}{\sqrt{(\sum_{n=1}^N |V_n(\rho_1)|^2)(\sum_{n=1}^N |V_n(\rho_2)|^2)}}$$

with  $V_n$  is the complex amplitude of either  $E_x$  or  $E_y$  of the  $n$ th mode.  $\rho_1$  and  $\rho_2$  are coordinates of two positions.



# Document Information

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toolbox(es)	Starter Toolbox
VL version used for simulations	7.4.0.49
category	Feature Use Case
further reading	<ul style="list-style-type: none"><li>- <a href="#">How to Work with the Programmable Detector and Example (Minimum and Maximum Wavelengths)</a></li><li>- <a href="#">Programming a Detector for Diffractive Optics Merit Functions Calculation</a></li></ul>