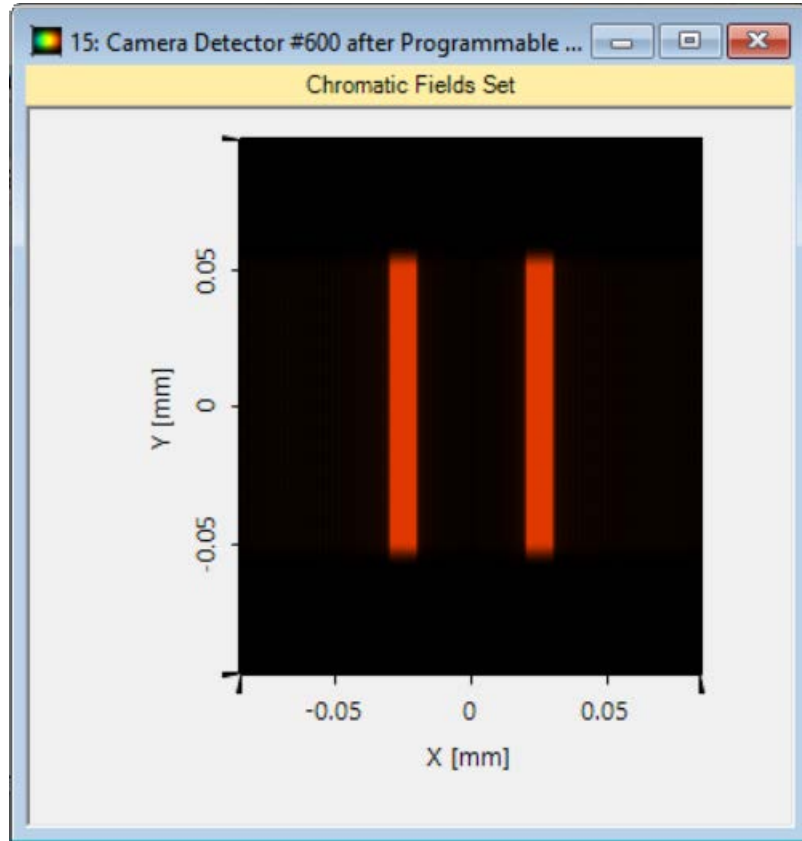


# Programming a Double Slit Function

# Abstract



In Fourier optics, optical components can often be modeled as a transmission function which gives a modulation to the amplitude and phase of the input field. VirtualLab Fusion offers Programmable Function, in which users can define the functional embodiment of a component. In this example, a snippet for defining a double slit function, with customizable slit width, is presented. The slits are infinite in y-direction and are placed on the x-axis, with the distance between the two slits as a user-defined parameter.

# Task Description & Sample Code

The slits are placed at positions:

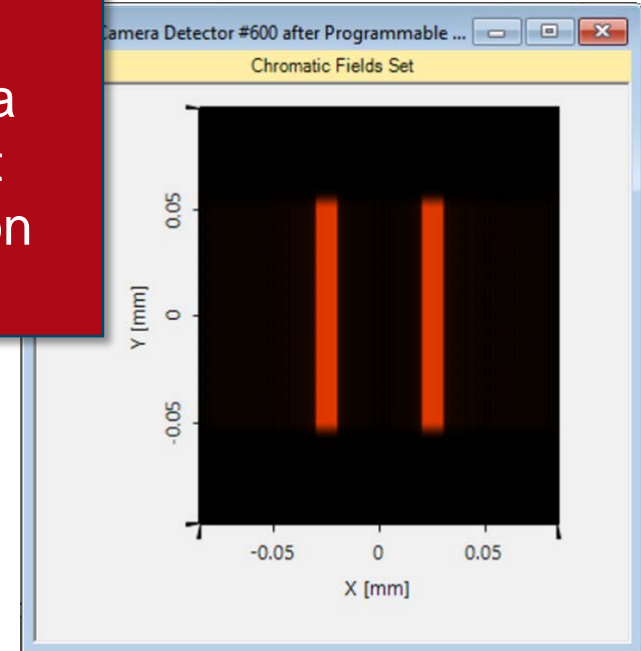
$$x_1 := -\text{SlitDistance}/2$$

$$x_2 := \text{SlitDistance}/2$$

The function  $f(x, y)$  is real, independent of  $y$ :

$$f(x, y) = \begin{cases} 1, & \text{if } |x - x_1| < \frac{\text{SlitWidth}}{2} \text{ or } |x - x_2| < \frac{\text{SlitWidth}}{2} \\ 0, & \text{otherwise} \end{cases}$$

**Task:**  
Generate a double slit transmission function



## Main Function

```
double realPart = 0.0;
double imaginaryPart = 0.0;
if ((x > (-0.5 * SlitWidth - 0.5 * SlitDistance) && x <
(+0.5 * SlitWidth - 0.5 * SlitDistance)) ||
((x > (-0.5 * SlitWidth + 0.5 * SlitDistance) && x <
(+0.5 * SlitWidth + 0.5 * SlitDistance)) ) ){
    realPart = 1;
}
return new Complex(realPart, imaginaryPart);
```

## Global Parameters (User Defined)

Variable	Value	Allowed range
double SlitWidth	10 um	0 mm - 1 m
double SlitDistance	50 um	0 mm - 1 m

# Document Information

title	Programming a Double Slit Function
document code	CZT.0030
version	1.0
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 Function in VirtualLab Fusion + Example (Cylindrical Lens)</a></li><li>- <a href="#">Programming an Axicon Transmission Function</a></li></ul>