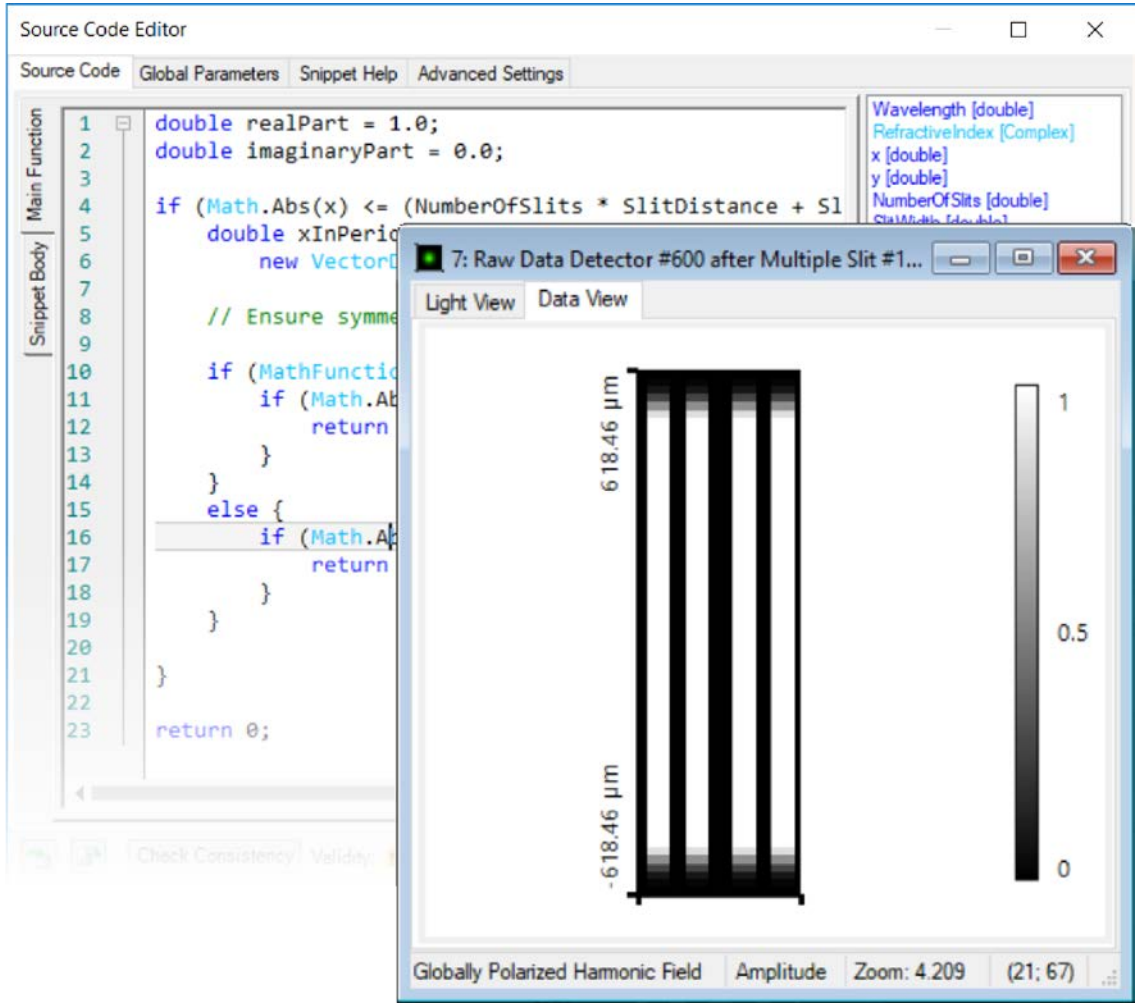
Programming a Multiple-Slit Transmission Function

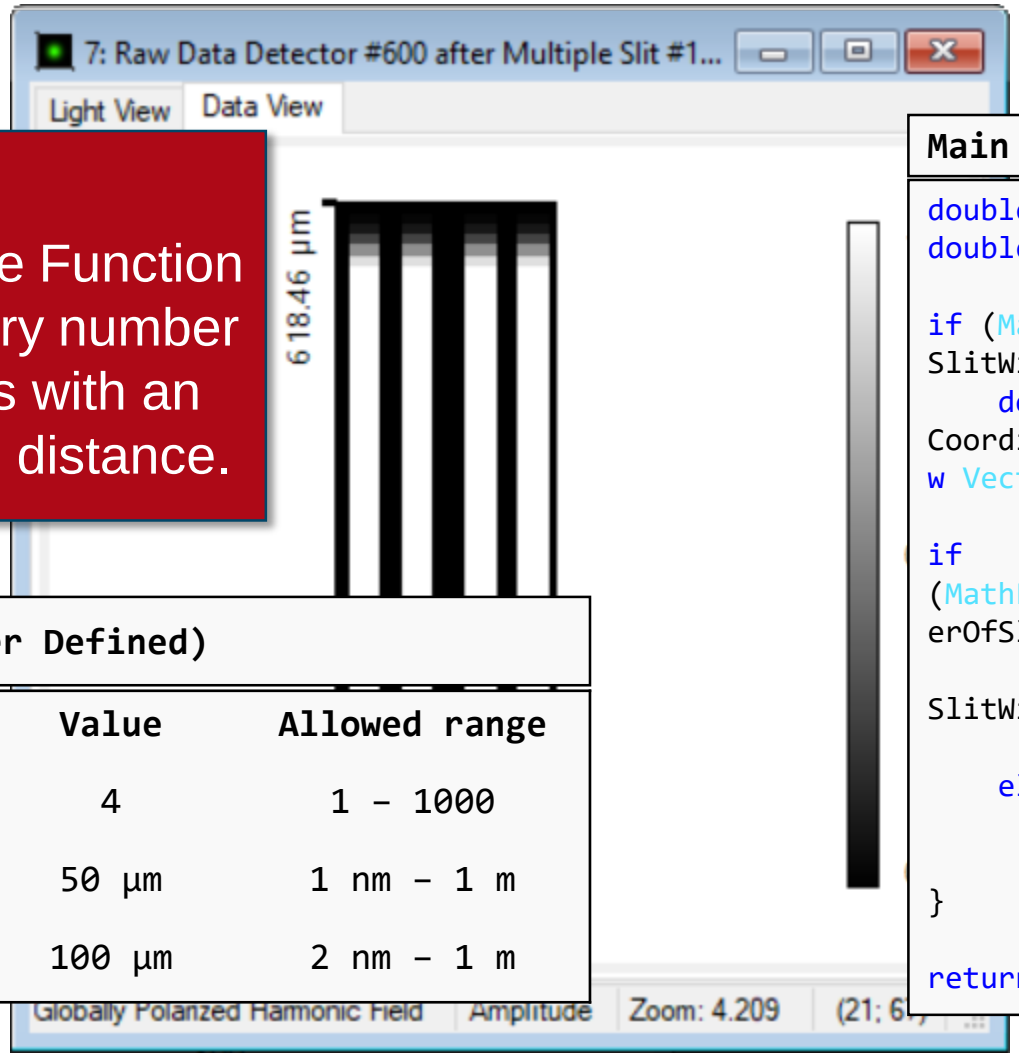
Abstract



VirtualLab Fusion provides full flexibility in the definition of transmission functions. Using the Programmable Function, we show an example which defines an arbitrary number of equidistantly separated slits, with user-defined width and distance. The resulting function is invariant in y-direction. Parameters of the multiple-slits, e.g. the number of slits, slit width and distance, are all customizable for the user.

Task Description & Sample Code

Task:
Use Programmable Function to define an arbitrary number of equidistant slits with an arbitrary width and distance.



Global Parameters (User Defined)

Variable	Value	Allowed range
double NumberOfSlits	4	1 – 1000
double SlitWidth	50 µm	1 nm – 1 m
double SlitDistance	100 µm	2 nm – 1 m

Main Function

```
double realPart = 1.0;
double imaginaryPart = 0.0;

if (Math.Abs(x) <= (NumberOfSlits * SlitDistance +
SlitWidth) / 2) {
    double xInPeriod =
CoordinateTransformations.CoordinateWithinPeriod(ne
w VectorD(x, 0),
        new VectorD(SlitDistance, 0)).X;
if
(MathFunctions.IsEven(MathFunctions.RoundToInt(Numb
erOfSlits))) {
        if (Math.Abs(xInPeriod) > (SlitDistance -
SlitWidth) / 2) {
            return 1;  }   }
    else {
        if (Math.Abs(xInPeriod) < SlitWidth / 2) {
            return 1    }  }
}

return 0;
```

Document Information

title	Programming a Multiple-Slit Transmission Function
document code	CZT.0059
version	1.0
toolbox(es)	Starter Toolbox
VL version used for simulations	7.4.0.49
category	Feature Use Case
further reading	- How to Work with the Programmable Function in VirtualLab Fusion + Example: Cylindrical Lens - Programming a Double Slit Function