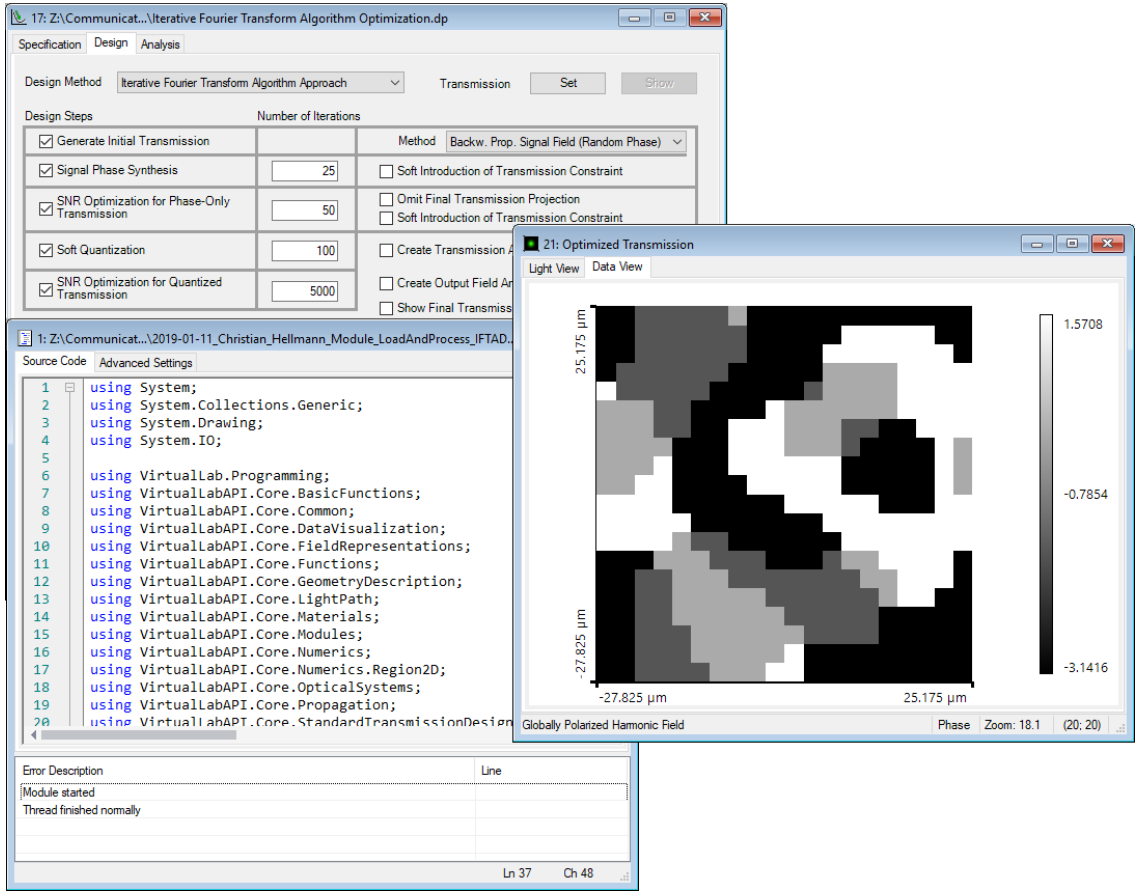
LightTrans

# Programming of a Module for Executing an IFTA Design

# Abstract




For the design of diffractive optical elements (DOEs), such as beam splitters, usually the iterative Fourier transform algorithm (IFTA) is applied. VirtualLab Fusion offers a step-by-step wizard for the configuration of all the design parameters. However, for some specific design tasks, it can be of interest, to be able to perform the algorithm in an automatized way and without the graphical user interface. Thus, in this document the execution of an IFTA design by using a customized C# module in VirtualLab Fusion is shown.

# Task Description & Sample Code

**Task:**
Design of a diffractive beam splitter (e.g. 5×5) by applying the IFTA, without using the interface of the wizard. After the design process, the performance of the designed element has to be investigated.

**Parameters (to be defined by user)**

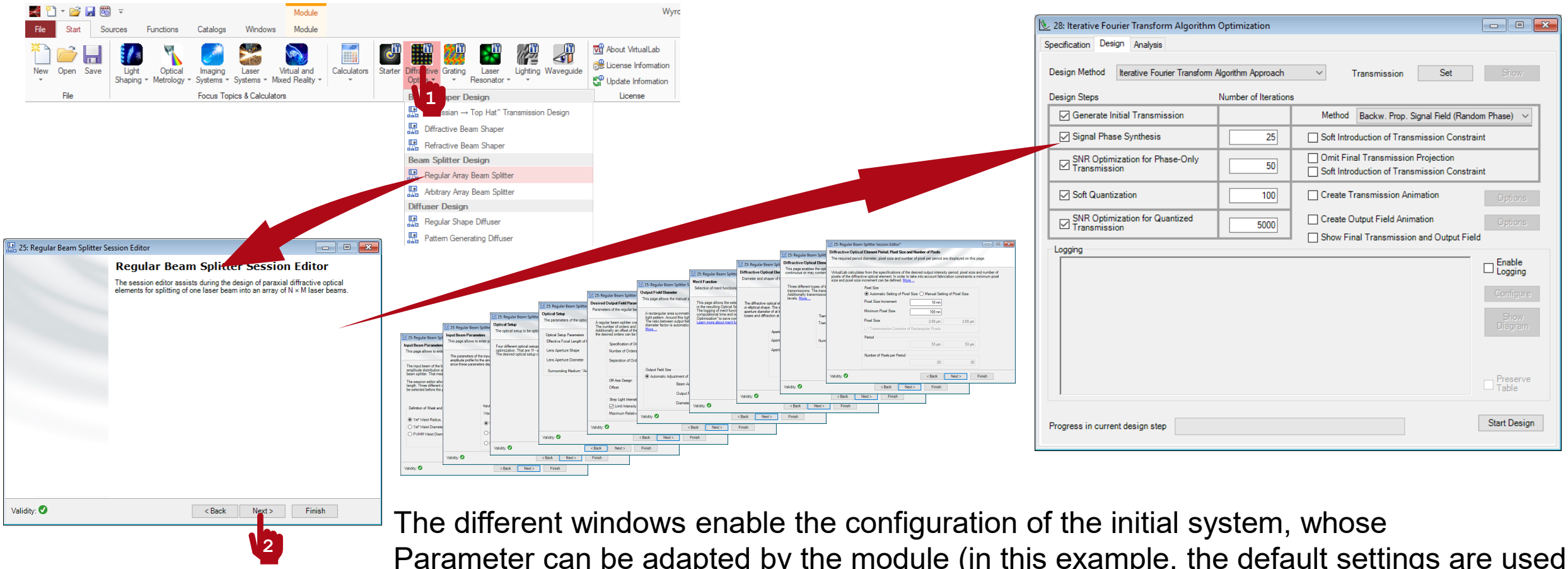
| Variable | Description |
|---|---|
| string pathofIFTAInputData | defines the path of the used files |
| string filenameIFTA | name of the initial IFTA file |
| string filenameMeritFunctionValues | Name of the text file for data output |

**Main Function (first part, continued in the sample file)**

```
namespace OwnCode {
    public class VLModule : IVLModule {
        //the path where all the data is located
        string pathofIFTAInputData = @"D:\IFTA Module\Example\";
        //file name of the IFTA document which should be loaded from hard disc
        string filenameIFTA = "Iterative Fourier Transform Algorithm Optimization.dp";
        //define filename for storage of merit function values
        string filenameMeritFunctionValues = "Result.txt";

        public void Run() {
            //load IFTA from hard disc
            DesignAlgorithmHandler design = DesignAlgorithmHandler.Load(Path.Combine(pathofIFTAInputData,
             filenameIFTA));
            //error handling
            if(design == null){
                Globals.DataDisplay.LogError("IFTA could not be loaded!");
                return;
            }

            //error handling
            if(caSignalField == null){
                Globals.DataDisplay.LogError("Signal could not be loaded!");
                return;
            }

            //read sampling parameters from design document
            SamplingParameters sPara = new SamplingParameters();
            sPara = new SamplingParameters(design.ConstraintSpecification.SamplingPoints,
                                           design.ConstraintSpecification.SamplingDistance);
```

# Preparation of the IFTA setup

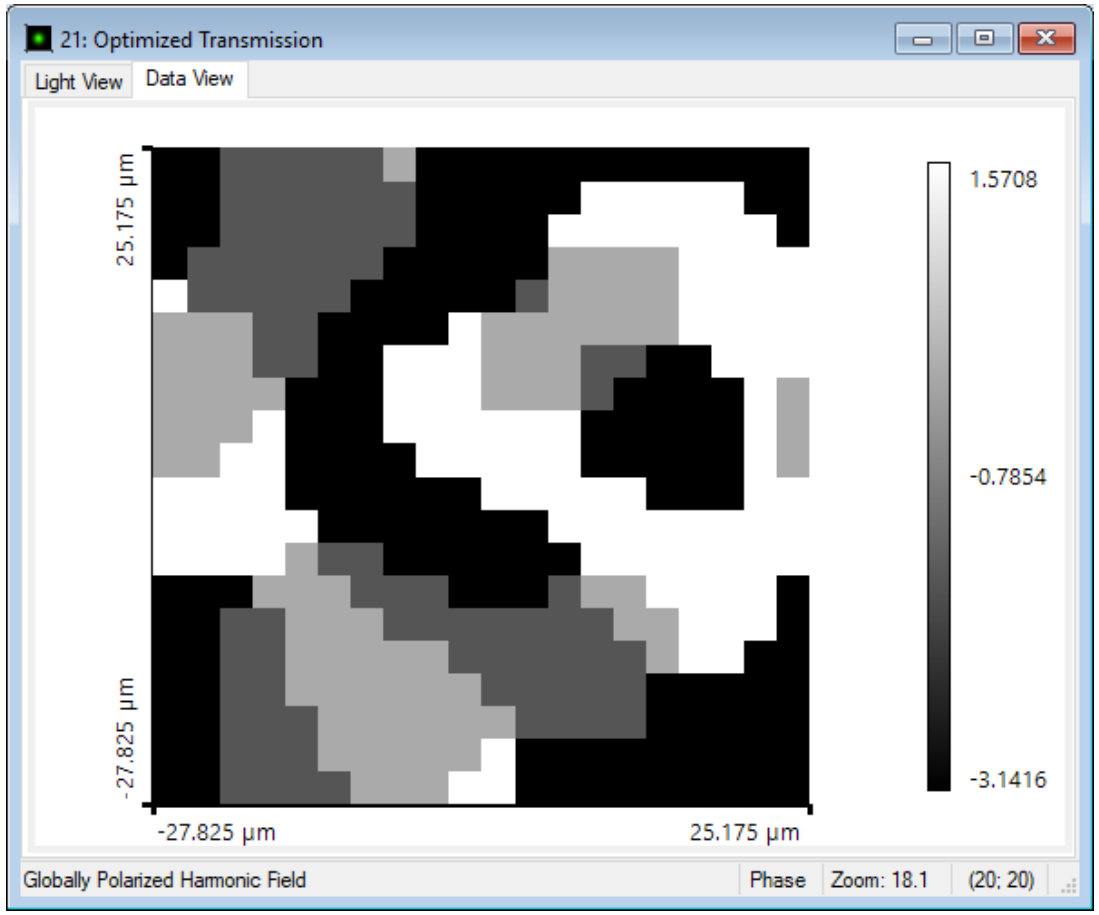
In order to run the module, an initial IFTA document has to be generated:



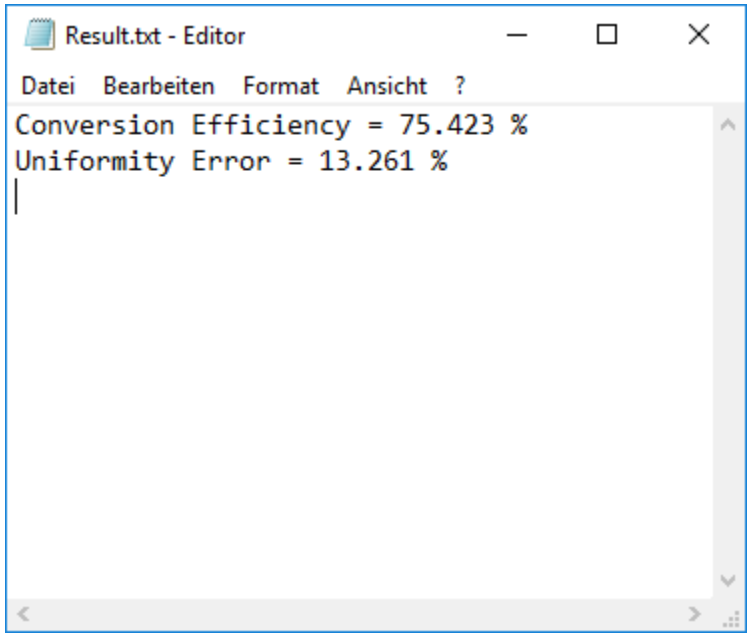

The different windows enable the configuration of the initial system, whose Parameter can be adapted by the module (in this example, the default settings are used.)

# Results

resulting phase function




performance output in text file



# Document Information

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|---|---|
| title | Programming of a Module for Executing an IFTA Design |
| document code | CZT.0110 |
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| category | Feature Use Case |
| further reading | - Customizable Help for Programmable Elements<br>- How to Work with the Programmable Function & Example (Cylindrical Lens) |