User’s Guide (version 1.2)

1- Getting Started

1. Install MongoDB (https://www.mongodb.com/download-center/community)
   Install nodejs (https://nodejs.org/en/download/) and a bash command line (https://gitforwindows.org/)
2. Create database and log directories: create a new file “data” then two more files “data\db” and “data\log”
3. Create a data store and collections for Dephine in MongoDB:

➢ With Robo 3T
   i. Install ROBO 3T and run it
   ii. Create a database “photonicsdb”

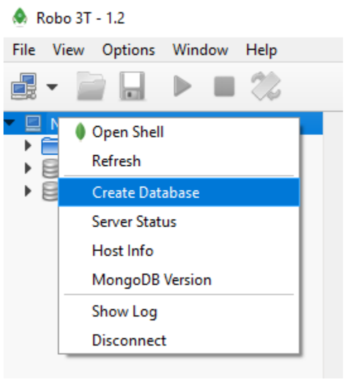


Figure Create a database with ROBO 3T

   iii. Create the collections “foundries”, “blocks”, “definitions”, “components”

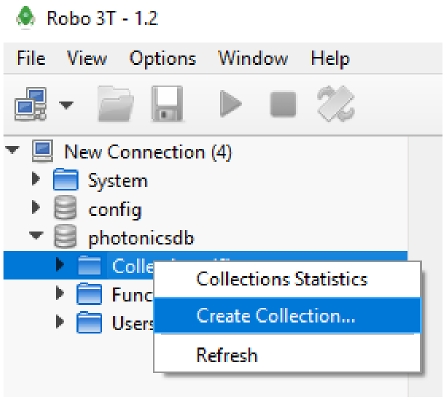


Figure Create a collection with ROBO 3T

➢ With mongo shell
   i. Run mongod.exe with administrator privileges (located by default in c:\program files\MongoDB\server\3.6\bin)

- Create a Database:

If a database does not exist, MongoDB creates the database when you first store data for that database. As such, you can switch to a non-existent database and perform the following operation in the mongo shell:

   ii. use photonicsdb

The insertOne() operation creates both the database myNewDB and the collection myNewCollection1 if they do not already exist.

- Create a Collection:

If a collection does not exist, MongoDB creates the collection when you first store data for that collection.

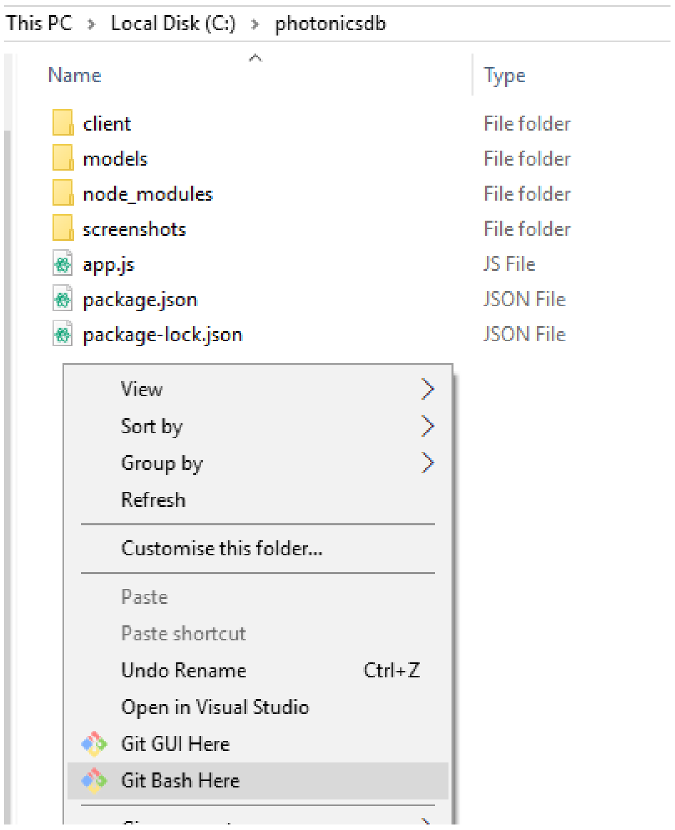
iii. db.foundries.insertOne({ x: 1 })

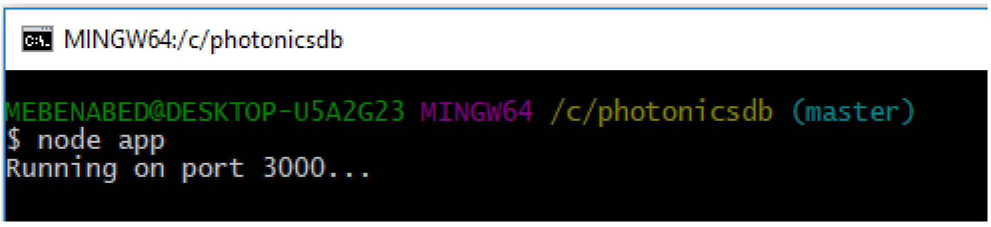
db.blocks.insertOne({ x: 1 })

db.definitions.insertOne({ x: 1 })

db.components.insertOne({ x: 1 })

4. Copy/paste photonicsdb (root folder) file with its content
5. Git Bash in c:\photonicsdb




MINGW64:/c/photonicsdb

```
MEBENABED@DESKTOP-U5A2G23 MINGW64 /c/photonicsdb (master)
$ node app
Running on port 3000...
```

6. Run the command "node app"
7. Run Dephine on a browser on: http://localhost:3000 (subject to changes for secondary nodes).

2- Data Schema

Data is distributed between 4 collections: Foundries, Blocks, Definitions (also called Classes) and Components (also called Attributes). Every collection contains documents and every document contains attributes (not to mix with Attributes collection). The figure below maps this distribution.

Foundries	Blocks	Definitions (classes)	Components (attributes)
• name	• name	• name	• name
• contact	• foundry	• function	• type
• mail	• function	• specifications (parameters)	• foundry (only for references)
• phone	• class		• blocks (only for references)
• url	• status (e.g. obsolete)		
• notes	• reference (e.g. PDK)		
	• source		
	• notes		
	• parameters (custom parameters)		
	• values (custom)		
	• values (class bound)		

3- Browsing

➢ **The navbar**

The navbar has 8 links: *home, blocks, insights, scopes, definitions, attributes*, collapsible *add, foundries* and *doc*. These links lead to their respective views. The navbar has a toggler triggered by smaller screen sizes.

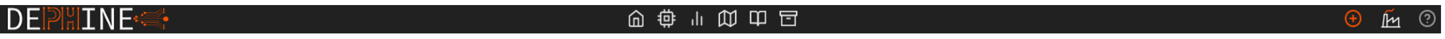


Figure the navbar

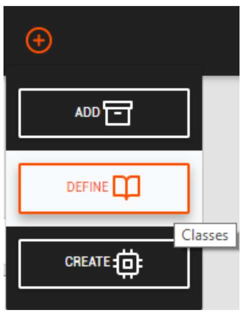


Figure Collapsible add

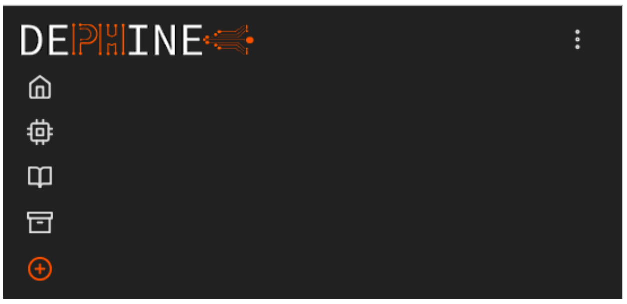


Figure navbar toggler (in the top left)

➢ **The views**

- **Blocks**
  Blocks' collection documents are returned on cards, every card has blocks' attributes and a "more info" button leading to the single block **view**. This view has a clipboard copy button (on top of **the filtering panel**).

- The filtering panel consists of:
  A search form has 5 fields: 3 (blank) search within all the block attributes (including the name), one search within their names and the last one search within blocks' notes.
  4 selection forms to filter the blocks by foundry, by reference, by function and by class (filtered by the functions selection form in the same panel).
  A count for the displayed blocks.
  A button to show or hide blocks' classification (foundry, function, class).
  A popover button explaining the adjacent switch.
  A switch cascading showing only up-to-date blocks when it's on (dark orange) and all the blocks when it's off (light orange).

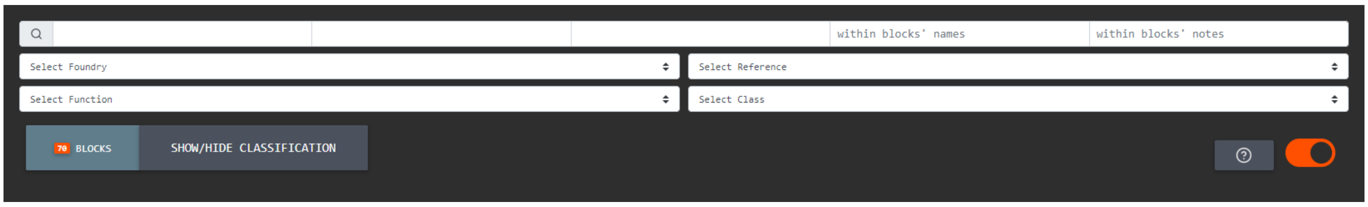


Figure Filtering panel

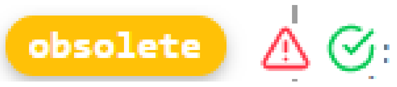
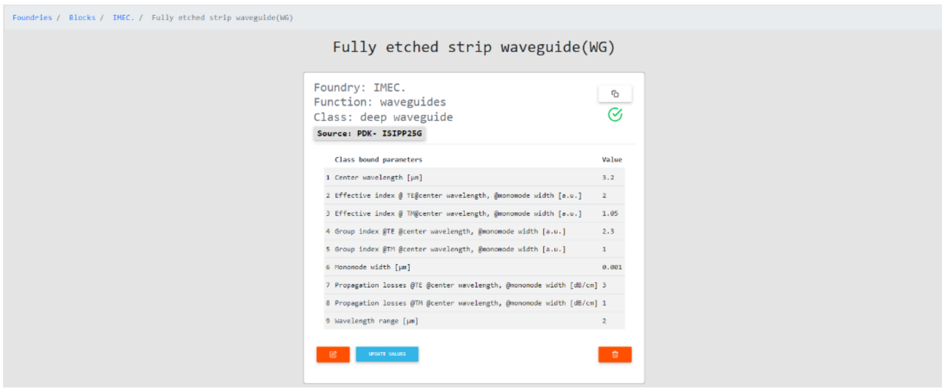


Figure Block attributes: Obsolete, to be updated (red) and up-to-date (green)

- **Block**
  Loaded upon clicking on a "more info" button on the blocks view (Also by clicking a block name in the **foundry view, scopes view** and **insights view**.
  It returns accessed block and the assigned class. The view has a clipboard copy button, an Edit button (bottom left) leading to **edit_block view**, an "update values" button to **fill_block view** and a delete button (bottom right).



Foundries / Blocks / IMEC. / Fully etched strip waveguide(WG)

Fully etched strip waveguide(WG)

Foundry: IMEC.
Function: waveguides
Class: deep waveguide
Source: PDK- ISIPP25G

	Class bound parameters	Value
1	Center wavelength [μm]	3.2
2	Effective index @ TE@center wavelength, @monomode width [a.u.]	2
3	Effective index @ TM@center wavelength, @monomode width [a.u.]	1.05
4	Group index @TE @center wavelength, @monomode width [a.u.]	2.3
5	Group index @TM @center wavelength, @monomode width [a.u.]	1
6	Monomode width [μm]	0.001
7	Propagation losses @TE @center wavelength, @monomode width [dB/cm]	3
8	Propagation losses @TM @center wavelength, @monomode width [dB/cm]	1
9	Wavelength range [μm]	2

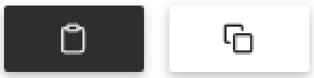
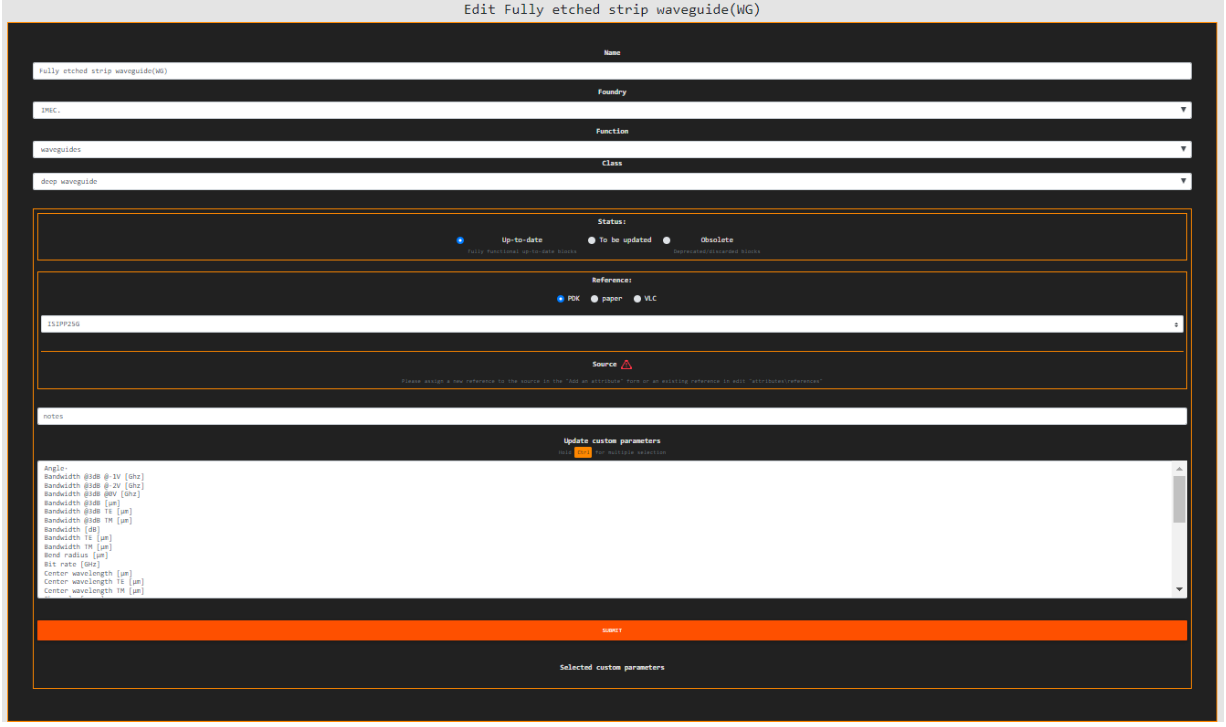


Figure Block view *Figure Notes popover button and clipboard copy button*

- **edit_block**
  Returns a form prefilled with the block attributes that can be updated through the submit button. Hold <ctrl> for multiple selection of outstanding parameters, <shift> for sequential selection and click back to deselect. Selected parameters are shown under the submit button. The classes to the functions and the sources that are shown are bound to the foundry.


Edit Fully etched strip waveguide(WG)

Name: Fully etched strip waveguide(WG)

Foundry: IMEC.

Function: waveguides

Class: deep waveguide

Status: [✓ Up-to-date] To be updated Obsolete

Fully functional up-to-date blocks — Deprecated/discarded blocks

Reference: [✓ PDK] paper VLC

ISIPP25G

Source ⚠

Please assign a new reference to the source in the "Add an attribute" form or an existing reference in edit "attributes\references"

notes

Update custom parameters

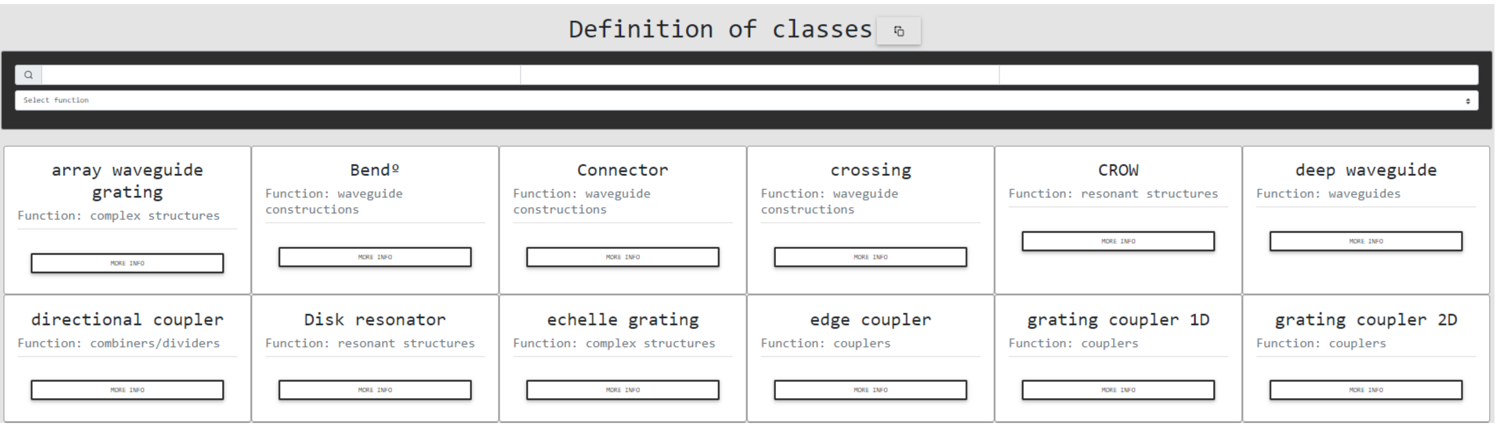
Hold Ctrl for multiple selection

```
Angle-
Bandwidth @3dB @-1V [Ghz]
Bandwidth @3dB @-2V [Ghz]
Bandwidth @3dB @0V [Ghz]
Bandwidth @3dB [µm]
Bandwidth @3dB TE [µm]
Bandwidth @3dB TM [µm]
Bandwidth [dB]
Bandwidth TE [µm]
Bandwidth TM [µm]
Bend radius [µm]
Bit rate [GHz]
Center wavelength [µm]
Center wavelength TE [µm]
Center wavelength TM [µm]
```

Selected custom parameters

Figure Edit block view

- **fill_block**
  Displays the block view where you can update parameters' values and mark whether blocks are up-to-date or to be updated.
- **Definition of classes** 🕮
  Returns definitions (classes) attributes and a "more info" button leading to the single **definition view.** This view has a form with 3 search fields within all the attributes and a filtering classes by function form.

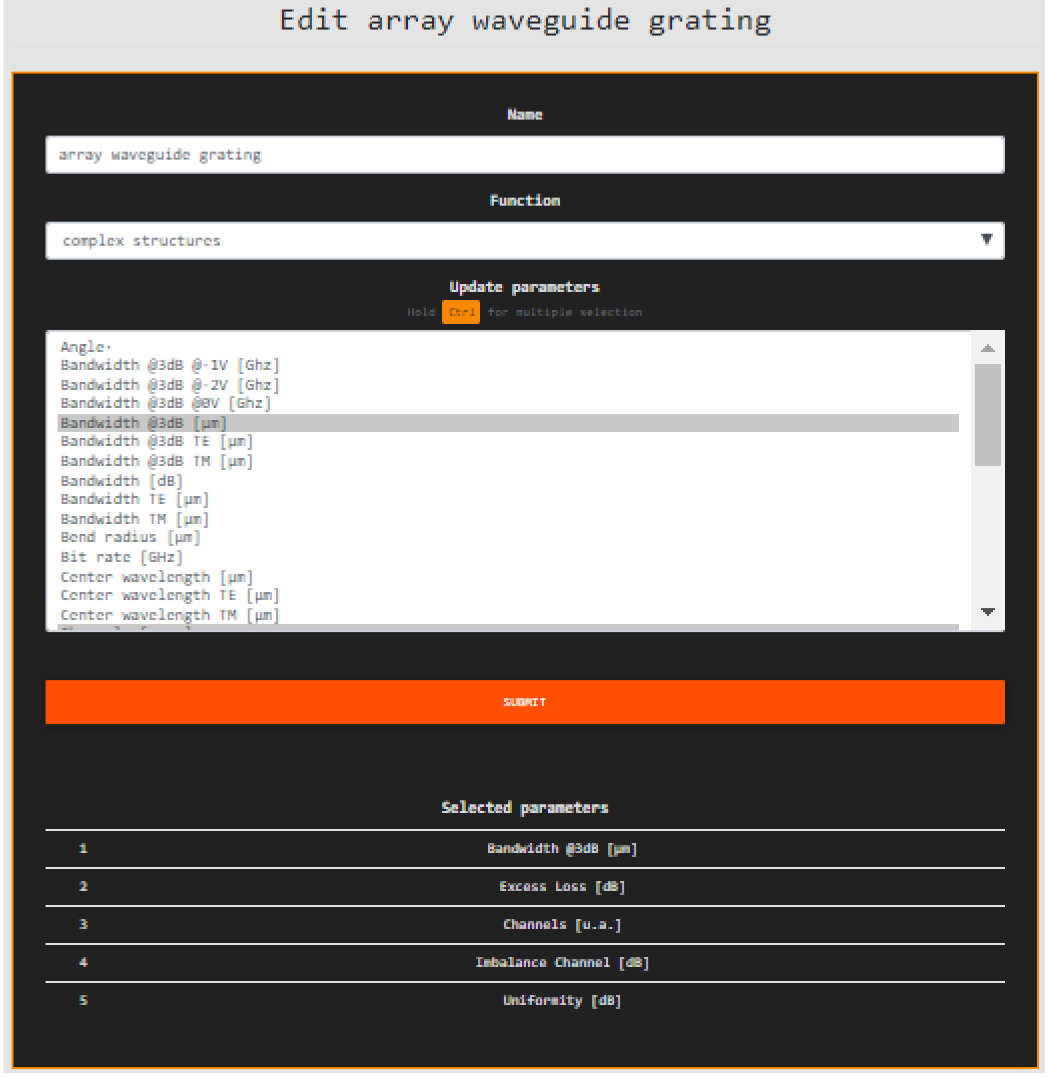

Definition of classes

Select function

array waveguide grating Function: complex structures	Bendº Function: waveguide constructions	Connector Function: waveguide constructions	crossing Function: waveguide constructions	CROW Function: resonant structures	deep waveguide Function: waveguides
MORE INFO	MORE INFO	MORE INFO	MORE INFO	MORE INFO	MORE INFO
directional coupler Function: combiners/dividers	Disk resonator Function: resonant structures	echelle grating Function: complex structures	edge coupler Function: couplers	grating coupler 1D Function: couplers	grating coupler 2D Function: couplers
MORE INFO	MORE INFO	MORE INFO	MORE INFO	MORE INFO	MORE INFO

Figure Definition of classes view

- **Definition**
  Returns accessed class document displaying its attributes. This view has a clipboard copy button, an Edit button (left bottom) leading to **edit_definition view** and a delete button.
- **edit_definition**
  Returns a form prefilled with the definition attributes that can be updated through the submit button. Hold <ctrl> for multiple selection of outstanding parameters, <shift> for sequential selection and click back to deselect. Selected parameters are shown under the submit button.


Edit array waveguide grating

Name

array waveguide grating

Function

complex structures

Update parameters

Hold Ctrl for multiple selection

Angle·
Bandwidth @3dB @-1V [Ghz]
Bandwidth @3dB @-2V [Ghz]
Bandwidth @3dB @0V [Ghz]
Bandwidth @3dB [µm]
Bandwidth @3dB TE [µm]
Bandwidth @3dB TM [µm]
Bandwidth [dB]
Bandwidth TE [µm]
Bandwidth TM [µm]
Bend radius [µm]
Bit rate [GHz]
Center wavelength [µm]
Center wavelength TE [µm]
Center wavelength TM [µm]

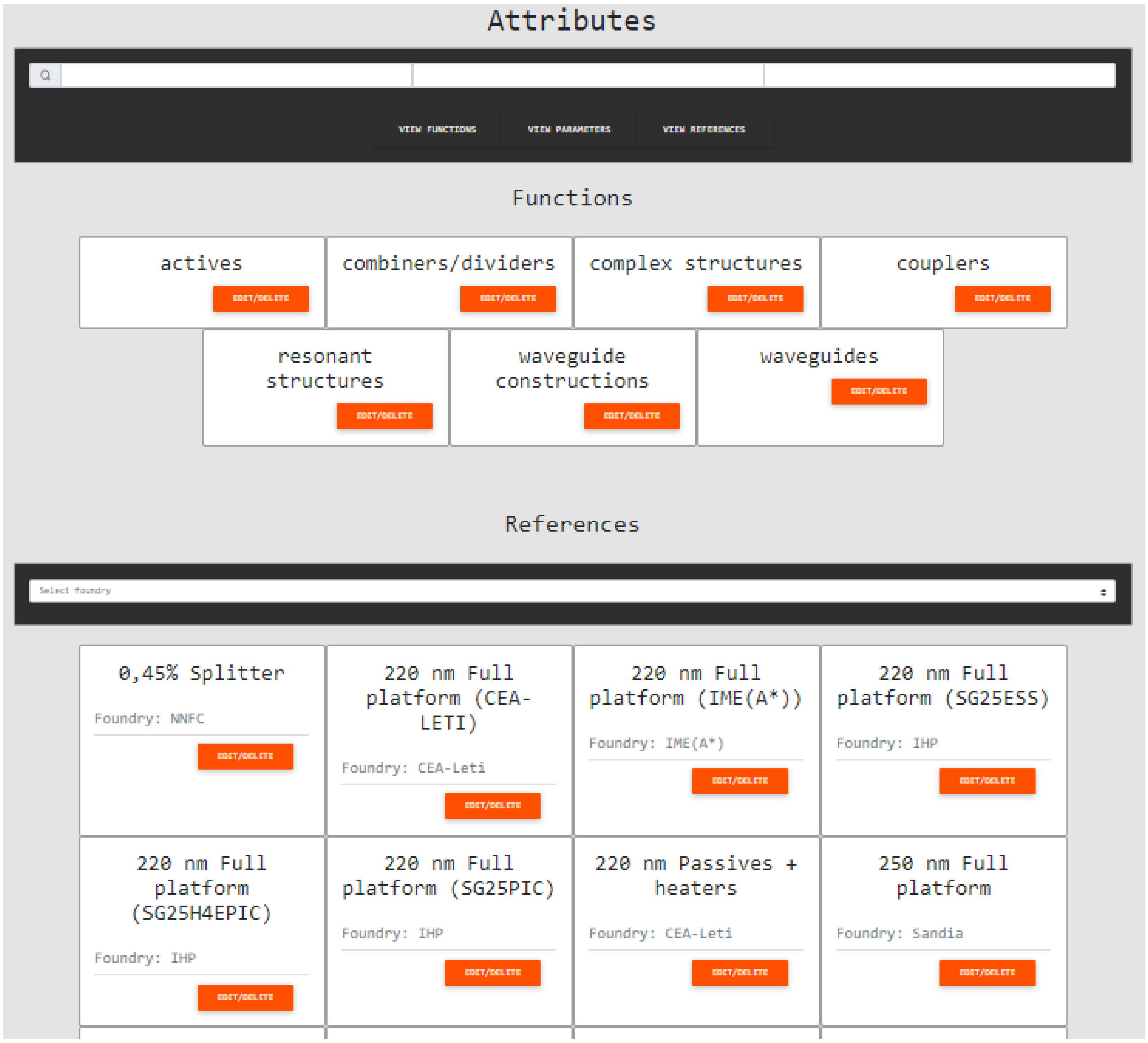
SUBMIT

Selected parameters

1	Bandwidth @3dB [µm]
2	Excess Loss [dB]
3	Channels [u.a.]
4	Imbalance Channel [dB]
5	Uniformity [dB]

Figure Edit definition

- **Attributes** 🗃
  Returns attributes documents. Attributes are divided into 3 types: functions, parameters and references.



Attributes

Functions

actives

combiners/dividers

complex structures

couplers

resonant structures

waveguide constructions

waveguides

References

0,45% Splitter
Foundry: NNFC

220 nm Full platform (CEA-LETI)
Foundry: CEA-Leti

220 nm Full platform (IME(A*))
Foundry: IME(A*)

220 nm Full platform (SG25ESS)
Foundry: IHP

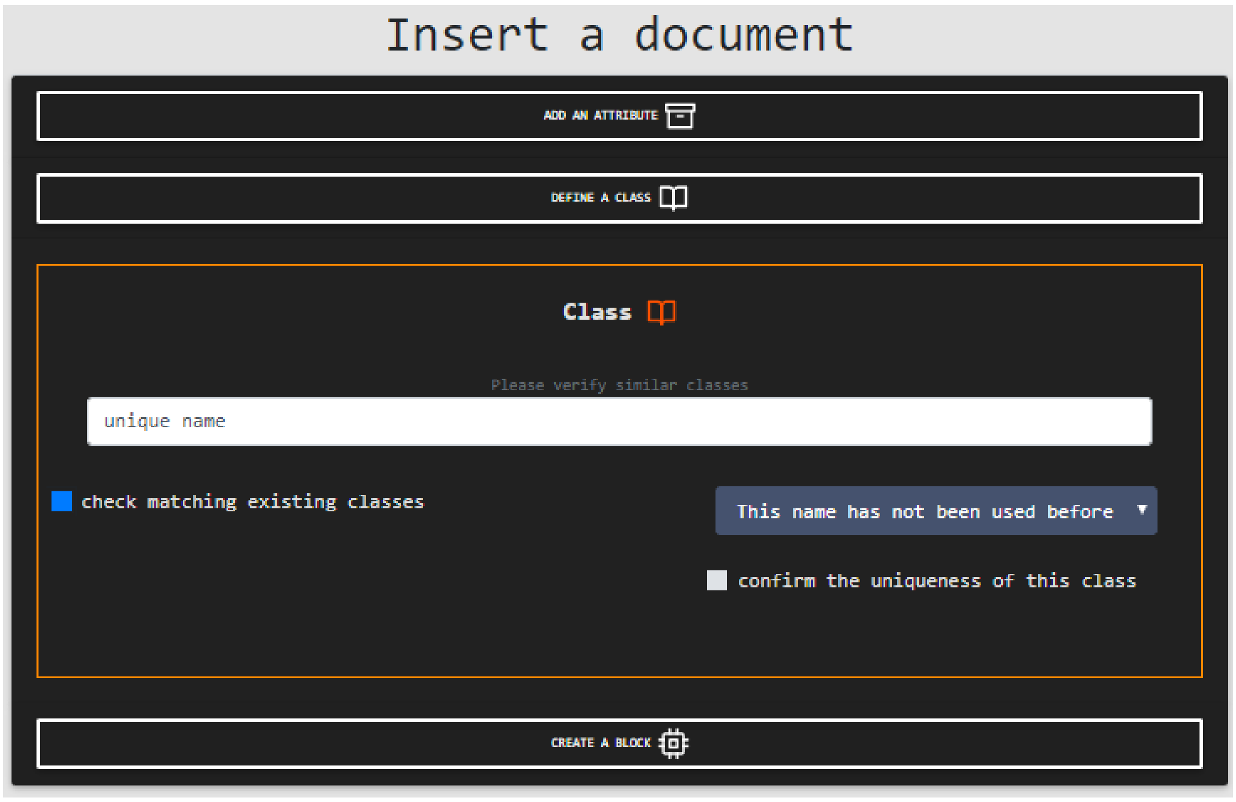
220 nm Full platform (SG25H4EPIC)
Foundry: IHP

220 nm Full platform (SG25PIC)
Foundry: IHP

220 nm Passives + heaters
Foundry: CEA-Leti

250 nm Full platform
Foundry: Sandia

- **Attribute**
  Returns attribute single document with its edit and delete button
- **Foundries**
  Returns foundries documents displaying attributes and a "more info" button leading to the single **foundry view**. The form has 3 search fields within all the attributes of the document
- **Foundry view**
  Accessed foundry document is returned with the foundry attributes, also, listing blocks having the accessed foundry as an attribute filtrable by class. This view has an Edit button (left bottom) leading to **edit_foundry view**, a delete button a popover notes button and a clipboard copy button.
- **edit_foundry**
  Returns a form prefilled with the foundry attributes that can be updated through the submit button.
- **Add/addf/addc/addb**
  Returns forms to create attributes documents on collection. A name for the document is the only required attribute for creating the document.
  Note: In order to create documents with unique names forms and submit buttons are hidden until confirming the uniqueness of the typed name that should only be done if the sole option "This name has not been used before" is left.



Please verify similar classes

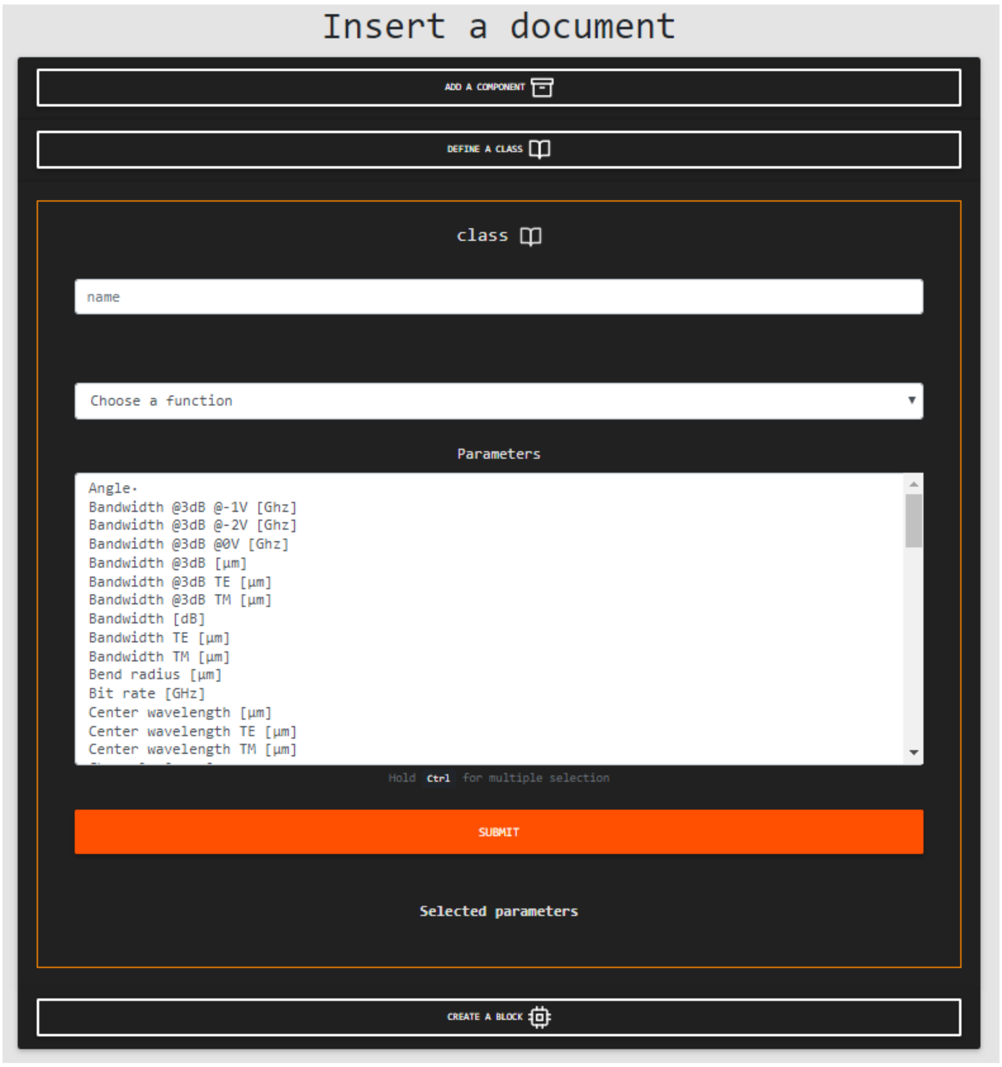
unique name

🟦 check matching existing classes

This name has not been used before ▾

☐ confirm the uniqueness of this class

Figure Name form uniqueness confirmation



```
Angle·
Bandwidth @3dB @-1V [Ghz]
Bandwidth @3dB @-2V [Ghz]
Bandwidth @3dB @0V [Ghz]
Bandwidth @3dB [µm]
Bandwidth @3dB TE [µm]
Bandwidth @3dB TM [µm]
Bandwidth [dB]
Bandwidth TE [µm]
Bandwidth TM [µm]
Bend radius [µm]
Bit rate [GHz]
Center wavelength [µm]
Center wavelength TE [µm]
Center wavelength TM [µm]
```

Hold **Ctrl** for multiple selection

Figure addc view