

Revolutionize Your Chip Design with gdsfactory

Event title: Swissphotonics PIC

In person event Convention: https://www.swissphotonics.net/home?event_id=4334

Online GDSFactory talk: [Join the meeting now](#)

Date: Friday, 21 June 2024, 12h30-13h30 CET

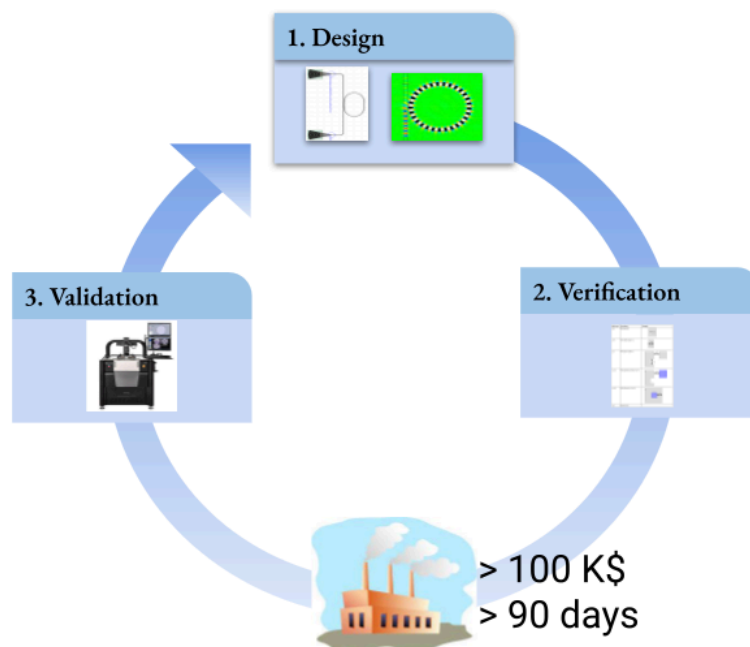
Venue: Polariton Technologies AG, Adliswil, Zürich, Switzerland

Time: 12:30 to 13:30


Abstract

For efficient design, verification and validation of integrated circuits and components it is important to have an easy to customize and extend workflow. Python has become the standard programming language for machine learning, scientific computing and engineering.

In this [tutorial](#) we will use gdsfactory to design photonic circuits: a heater, a photonic MZI filter and a ring resonator. This will allow you to leverage the machine learning tools (python, jupyter notebooks) into chip design.

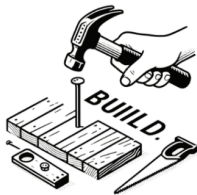


Agenda (1:30 hour):

- 0 min: Download training materials in [jupyter notebooks before workshop](#)
 - Install Python, sax, tidy3d, femwell, gdsfactory and Klayout
- 15 min: intro to gdsfactory  gdsfactory slides
- 15 min: layout tutorial with gdsfactory
- 5 min: DRC using klayout
- 30 min Design, Layout and Verification tutorials.
 - Mode solver simulations
 - MZI circuit simulations
- 25 min: QA

BIO

Joaquin has designed chips in python for 15 years in Companies such as Intel, Hewlett Packard Labs, PsiQuantum and Google X. Joaquin started the open source gdsfactory project in 2019 to build better chips in python, Since then it has been downloaded over 2 Million times. Joaquin also works closely with open source developers at Google with the [build your own silicon](#) program, where they are trying to repeat the successful eco-system that open source tensorflow has created for machine learning since 2016 into building open source chip design tools.



In-House Development

Limited by your engineers **time**.



Buy

Bound by vendor **limitations**.



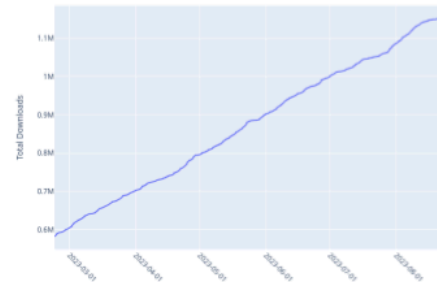
Open Source

- **Free:** Gain advantages from the collective development of the open source community.
- **Extensible:** Customize and enhance with home-built features tailored to your needs.

GDSFACTORY

- Highlights
 - 1M+ downloads
 - 50+ contributors
 - 10+ PDKs
- 100% Open source, Python based
 - Works on Linux, Windows and MacOS
- Extensible Plugins

Total Downloads - gdsfactory



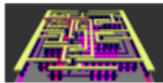
Device and
Circuit
simulations



LUMERICAL



3D view



Simulation API

Python
Environment

Design Feedback

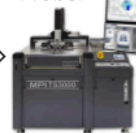
Layout + DRC API



PROBE SW Test Plan

Wafer Level
Prober

Wafer Level
Die Bonder



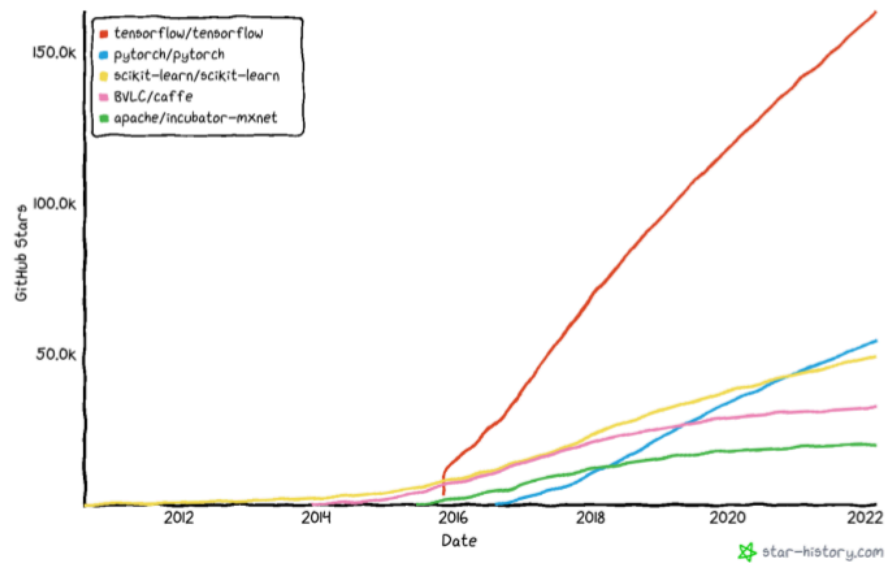
Test Feedback

Tech File and PDK



Bring the **success** of machine learning

Star history



Into chip design



Build me a
*Mach-Zehnder
Interferometer*

```
@gf.cell
def mzi(delta_length: float = 10.0) -> gf.Component:
    """Create a Mach-Zehnder Interferometer component with an adjustable length difference
    between the two arms.

    Args:
        delta_length: Length difference between the two arms of the MZI.

    Returns:
        Mach-Zehnder Interferometer component.
    """
    c = gf.Component()

    splitter = c << gf.components.mmx2()

    # Bottom arm
    bottom_arm = c << mzi_arm()

    bottom_arm.mirror(p1=(0, 0), p2=(1, 0))

    bottom_arm.connect(port="o1", destination=splitter.ports["o3"])

    # Combiner
    combiner = c << gf.components.mmx2()
```

