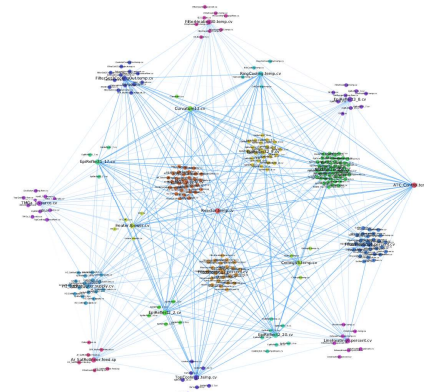


## Causal Model as a System Model for an MOCVD machine

### Background

In the project "MOCVD4.2", we are exploring the suitability of a **machine learning system model** as a substitute for a system simulation or an exact mathematical model. The data available in this project are **time-series** based and are recorded during the growth of crystal layers on graphite wafers to create complex semiconductor multilayer structures. The process is called metalorganic chemical vapour deposition (MOCVD).

Creating predictions for temperature sensors are one of the main goals, but prediction alone is not enough. A thorough understanding of the machine and interactions between the sensors, with a specific focus on **causality** is required.



### Research methodology

- A thorough literature review on the topics of Causal Models for Time Series, data driven Causal Model training and assumptions that need to be satisfied.
- Creating visual representations of the relationships between the devices in the MOCVD machine through **graphical models**.
- Making reliable and explainable predictions for temperature.
- Perform tests of possible interventions on the finished model.

### Objectives and expected results

- Working temperature causal model
- Graphical representations of causality structures

### Requirements

- Experience with Python, familiarity with packages such as networkx and plotly would be beneficial
- Curiosity about causality and a grasp on the basics of machine learning
- Experience with time series data would be beneficial

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