Creating a machine learning based outlier removal algorithm that incorporates a priori knowledge of the physics involved.

Student: Thomas Kamminga
University supervisor: Alexander Heinlein
Company supervisor: Lucas Bekker

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Stability of ASML's machines (TwinScans) over time is extremely valuable to its customers. Possible sources of instability are physical degradation of hardware components or changes to the state of the machine. Stability is achieved by means of a drift control loop that uses offline measurements to correct the "Scanner Baseline Constants" to the (sub) nanometer level. The models that are used are sensitive to noise and outliers in the measurement data, making high quality outlier removal algorithms crucial to achieve optimal stability.

For this project, we want to employ machine learning methods to remove the outliers, investigate the nature of the outliers and how they impact the model performance. To efficiently learn from the data we want to design the machine learning model in such a way that it incorpates a priori knowledge of the physical systems which created the measurements. We can then compare the machine learning based model with the current method and see if it leads to an improvement.