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The Python Accelerator Middle Layer Project

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Many synchrotron light sources use the software Matlab Middle Layer (MML) for commissioning, operation and accelerator tuning. MML was initiated in the 1990s and has since then been widely adopted because of key features like control system agnostic hardware abstraction, independence of naming conventions and the possibility to group devices together. MML allows running on both the live machine and a simulator, making it feasible to develop and test new procedures before machine shifts. MML also both supports simple scripting for quick viability tests of new methods and running complex applications for standard procedures with demands on reliability.

However, over time MML has become outdated and fragmented, making it difficult to extend and maintain. In addition, Matlab is a propriety software with decreasing user base among accelerator physicists. This has highlighted the need for a new, modern open-source solution which meets the requirements of the 4th and future generations of light sources as well as other type of accelerators. A world-wide collaboration to develop a Python Accelerator Middle Layer (pyAML) has therefore been initiated. The project is now in a prototype phase that will be finished by the end of 2025.

Many requirements for pyAML are similar to MML, but it should also provide integration with existing Python packages (allowing use of high-performance computing, optimisation algorithms and machine learning), a digital twin and better data management. Essential for the success of the software is that it needs to support a wide experience range of users and that it should facilitate the research process going from an idea quickly tested during a machine shift to a robust application run during user operation which can be shared with other facilities.

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