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Thu-Mo-Po4.03-04 [15]: The Application of Coordination to Magnetic Measurement Automation: An SSW System Example

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The automation of magnetic measurements prevents human operator errors from impacting measurements and ensures the repeatability of the measurements and the traceability of the results to specific measurement scenarios. The presented approach achieves automation via parametrized scripting; this offers the user additional flexibility by providing the ability to define families of measurements and to tailor measurement algorithms to match their specific requirements. The selection of Python, a popular general-purpose programming language, as a scripting language rather than inventing a new domain specific mini language, allows the use of such advanced programming language features as exception handling, encapsulation and modularization. Scripts employ coordination to direct the execution of the measurement, and, therefore, follow the principle of separation of concerns. This results in extrication of the control flow from the data flow. The system is configured from loosely coupled multi-threaded components communicating via events. The coordination of components is accomplished in two ways: a) event-based orchestration via a script that sends control events and waits for acknowledgement from components and b) data flow-based choreography via data events sent from one component to another. The application of these techniques to the construction of an automated Single Stretched Wire (SSW) system is described, along with experiences from the practical use of the system for alignment measurements.

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