

# Retroactive sustainability improvements in the MERLIN particle tracking code

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MERLIN is a C++ particle tracking software package, originally developed at DESY for use in International Linear Collider (ILC) simulations. MERLIN has more recently been adapted for High-Luminosity Large Hadron Collider (HL-LHC) collimation studies, utilising more advanced scattering physics. However, as is all too common in existing high-energy physics software, recent developments have not focused on code design or sustainability. This had resulted in notable usability issues for users and developers alike. The following presents current developer endeavours to address these issues, adhering to modern sustainability practices. Quantifiable improvements in code complexity and usability are presented via profiling and test metrics. Moreover, changes in software architecture are analysed and the developer experiences, as well as the pros and cons of retroactively applying sustainability methodology, is discussed.

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