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Bayesian optimisation of the SHiP active muon shield

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The SHiP experiment is new general purpose fixed target experiment designed to complement collider experiments in the search for new physics. A 400 GeV/c proton beam from the CERN SPS will be dumped on a dense target to accumulate 2×10^{20} protons on target in five years.

A crucial part of the experiment is the active muon shield, which allows the detector to operate at a very high beam intensity while maintaining a zero-background environment for the search for new physics. In order to do this the muon flux has to be reduced from 10^{11} muons per second by 6 orders of magnitude in the shortest distance possible.

The presentation will describe the concept of the active muon shield, the particular challenges of this optimisation problem, which necessitate the use of modern optimisation techniques, and how they are overcome with these techniques. Recent results and their implications for the SHiP comprehensive design study and beyond are presented.

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