

# Porting the CMS pixel reconstruction to Julia: preliminary results

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The Patatrack pixel track reconstruction is a stand-alone project that has been extracted from the CMS reconstruction software. Over the years it has been used to test and evaluate different CPU and GPU technologies, like OpenMP, TBB, CUDA, HIP, SYCL, Kokkos, and Alpaka.

In order to evaluate the Julia programming language in the context of a realistic High Energy Physics software project, the Patatrack pixel track reconstruction is now being rewritten in Julia.

The project is under active development, and about 30% of the reconstruction algorithms have been documented, rewritten in Julia, and validated. The first results are very encouraging: the Julia version produces correct results, and has a single-threaded performance very close to that of the original C++ version.

This contribution will give an overview of the project and its long-term prospects, describe the challenges encountered during the work, along with the solutions chosen to address them, and present the preliminary results in terms of correctness and performance of the Julia implementation.

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