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Julia in high-energy physics: a paradigm shift or just another tool?

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The Julia programming language was designed for scientific computing and with its claimed usability („walks like Python“) and speed („runs like C“), it seems to be a scientists‘ software dream come true. Julia appears to be particularly well-suited for high-energy physics (HEP), where reliable software tools and rapid development cycles are crucial for everyday work. Whether it’s data processing, or the simulation of the whole experiment, or the final data analysis and interactive visualization, the Julia ecosystem —with over ten thousand packages —might be a modern and high-performance software solution and the right set of tools to easily build any missing pieces.

In this talk, we will discuss, if the Julia programming language meets these requirements and can withstands testing on the workbenches of HEP. Additionally, we give an overview of current contributions in Julia to the HEP-related software stack and its potential trajectory. Moreover, we explore how the software development process itself can benefit from Julia, as it strikes an ideal balance between high-performance technology and student-friendly training —an especially valuable combination for the rapidly moving high-energy physics community.

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