

Conceptualization of an S2I2 Institute for High Energy Physics (S2I2-HEP)

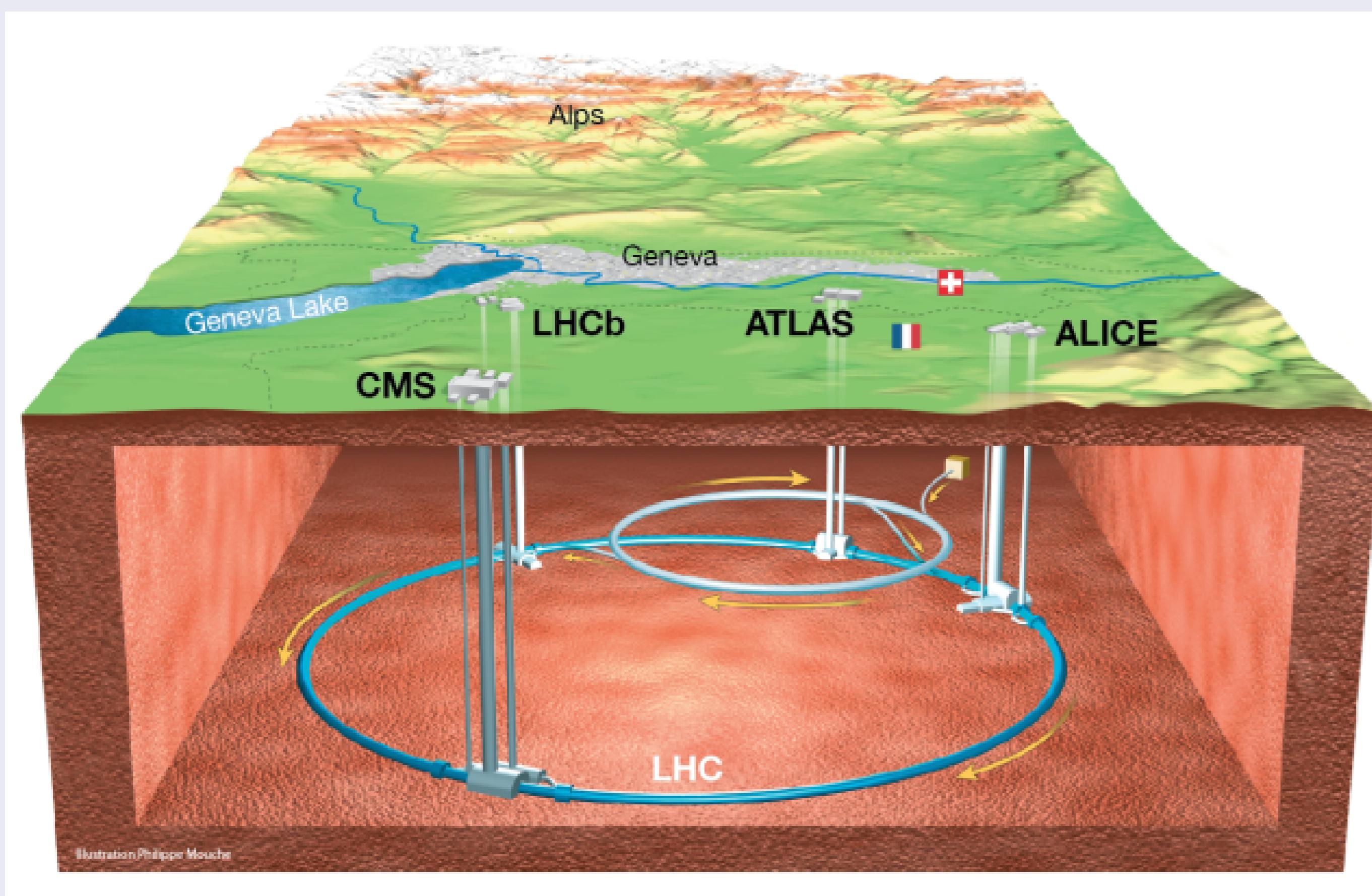
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The S2I2-HEP Project

The primary goal of the S2I2-HEP conceptualization project is to prepare a strategic plan for a potential NSF Scientific Software Innovation Institute (S2I2) to develop software for experiments taking data in the “High-Luminosity Large Hadron Collider” (HL-LHC) era in the 2020s. In addition, we are working with the HEP Software Foundation to prepare a larger HEP Community White Paper (CWP) describing a global roadmap for HEP Software and Computing R&D for the 2020s. To this end we are organizing a number of workshops between Fall 2016 and Summer 2017. The LHC experiments, for example, use nearly 0.5 Exabyte of storage today, and planned upgrades through the 2020s will increase this by more than a factor of 100.

High-Luminosity Large Hadron Collider (HL-LHC)

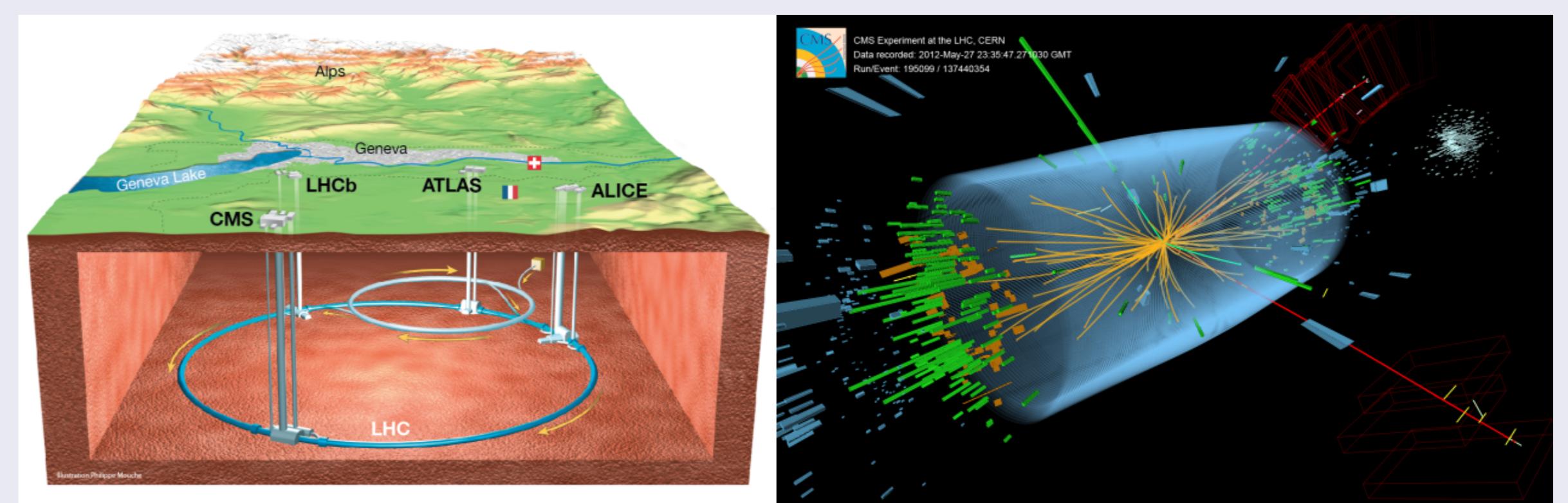
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High Energy Physics (HEP)

The quest to understand the fundamental building blocks of nature, and their interactions, is one of the longest running and most ambitious of human endeavors. Facilities such as the Large Hadron Collider (LHC), where we do our research, represent a huge step forward in our ability to answer these questions. The discovery of the Higgs boson, the observation of exceedingly rare decays of B mesons, and exclusion of countless theories beyond the Standard Model (SM) of particle physics demonstrate that these experiments deliver results. However, the most interesting fundamental physics questions remain wide open, amongst them: What is the dark matter which pervades the universe? Does space-time have additional symmetries or extend beyond the 3 spatial dimensions we know? What is the mechanism stabilizing the Higgs mass from enormous quantum corrections? Are neutrinos, whose only SM interactions are weak, their own anti-particles? Can the theories of gravity and quantum mechanics be reconciled? Planned and running HEP experiments aim to answer these questions over the next 20 years.

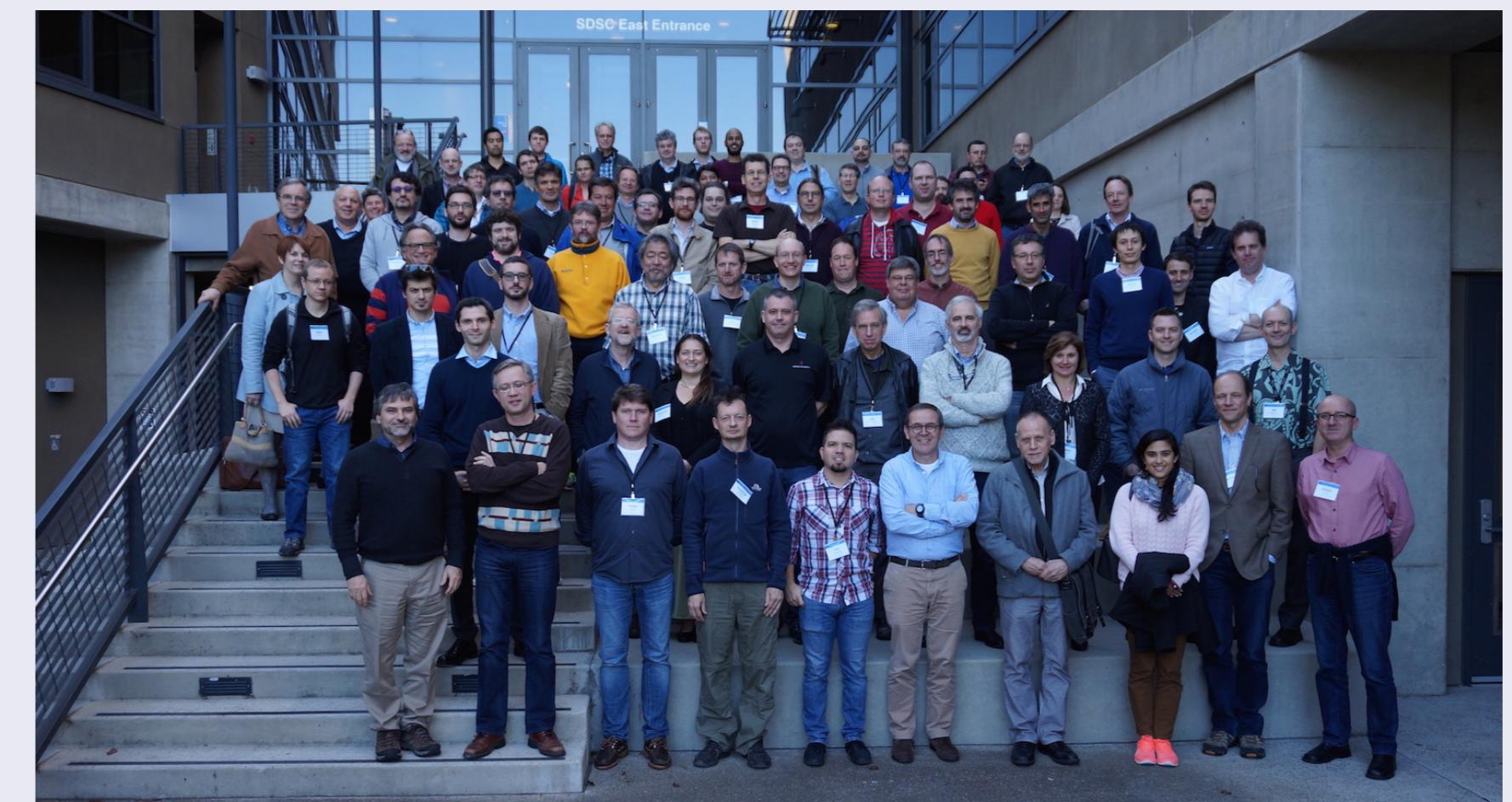


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The HEP Community and Software Ecosystem

HEP collaborations, US scientists/students involved in LHC, etc. (Additional text to fill in.)

The HEP Community and Software Ecosystem



The HEP Community and Software Ecosystem



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