

Accelerating fusion energy research through HPC

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For several decades, magnetic confinement fusion research has been driven largely by qualitative and semi-quantitative considerations, in what could be considered a "trial-and-error" style. This approach is now reaching its limits, however, as the necessary investments of time and money for new devices have grown substantially. To progress in an efficient and cost-effective manner, a more targeted process is needed from here on. In this context, increasingly comprehensive and realistic computations on clusters and supercomputers provide new, exciting opportunities. Building on recent advances, it is the goal of the European fusion theory community to make a substantial leap forward in this regard in the upcoming decade, boosted by the recently established E-TASC initiative. In this talk, I will provide an overview of the research plans for the time frame until about 2025, including some to-be-expected breakthroughs on the horizon, which are bound to help accelerate the development of fusion energy through HPC.