
Björn Gmeiner
**PetaScale Finite Element Methods for Hierarchical
Hybrid Grids using Hybrid Parallelization**

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In this talk we present a performance study of our finite element package Hierarchical Hybrid Grids (HHG) on current European supercomputers. HHG is designed to close the gap between the flexibility of finite elements and the efficiency of geometric multigrid by using a compromise between structured and unstructured grids. A coarse input FE mesh is refined in a structured way, resulting in semi-structured meshes. First we compare and analyze the efficiencies of the stencil-based code on those clusters. In a second step we discuss the τ -extrapolation multigrid technique to improve the FE accuracy for an exemplary electrochemistry application.