# Efficient Preconditioning of hp-FEM Matrices by Hierarchical Low-Rank Approximations

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In this talk I will introduce a preconditioner based on low-rank compression of Schur complements. The construction is inspired by the well-known nested dissection strategy, and relies on the assumption that the Schur complements that arise in the elimination process can be approximated, to high precision, by compressible matrices. The preconditioner is built as an approximate $LDM^t$ factorization of a given matrix $A$, and no knowledge of $A$ in assembled form is required by the construction. The $LDM^t$ factorization is amenable to fast inversion, and the inverse can be applied fast as well. I will present numerical experiments that investigate the behavior of the preconditioner in the context of Discontinuous Galerkin finite element approximations of positive-definite problems, as well as indefinite wave propagation problems.

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