

**Dr. Alexander Linke**

WIAS Berlin

**Towards pressure-robust mixed methods for the incompressible  
Navier-Stokes equations**

For more than thirty years it was thought that the efficient construction of pressure-robust mixed methods for the incompressible Navier-Stokes equations, whose velocity error is pressure-independent, was practically impossible. However, a novel, quite universal construction approach shows that it is indeed rather easy to construct pressure-robust mixed methods. The approach repairs a certain (L2-)orthogonality between gradient fields and discretely divergence-free test functions, and works for families of arbitrary-order mixed finite element methods, arbitrary-order discontinuous Galerkin methods, and finite volume methods. Novel benchmarks for the incompressible Navier-Stokes equations show that the approach promises significant speedups in computational practice, whenever the continuous pressure is complicated.