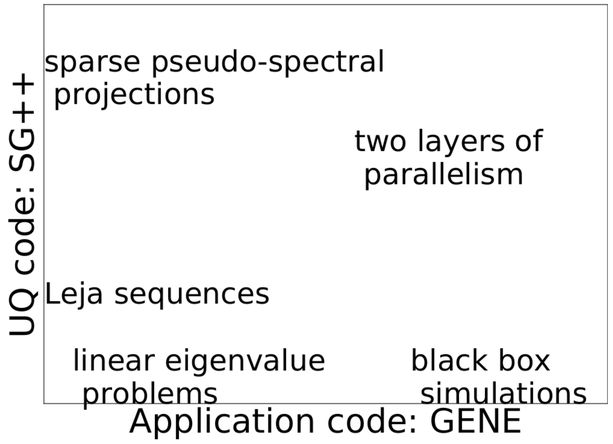
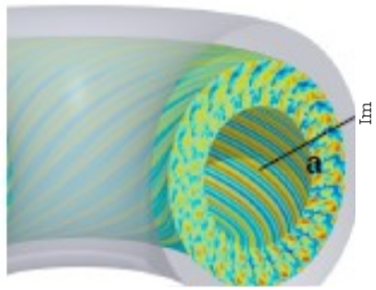
A Sparse Pseudo-Spectral Projection Method in Linear Gyrokinetics

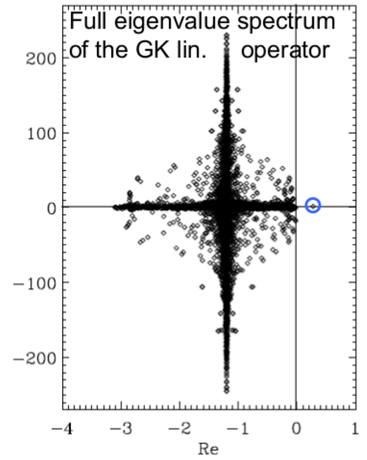
Ionuț-Gabriel Farcaș[§], Tobias Goerler[*], Hans-Joachim Bungartz[§], Tobias Neckel[§]
[§] Technical University of Munich, Chair of Scientific Computing, Boltzmannstr. 3, 85748 Garching, Germany, **farcasi@in.tum.de**
[*] Max Planck Institute for Plasma Physics, Boltzmannstr. 2, 85748 Garching, Germany

Challenging real-world application

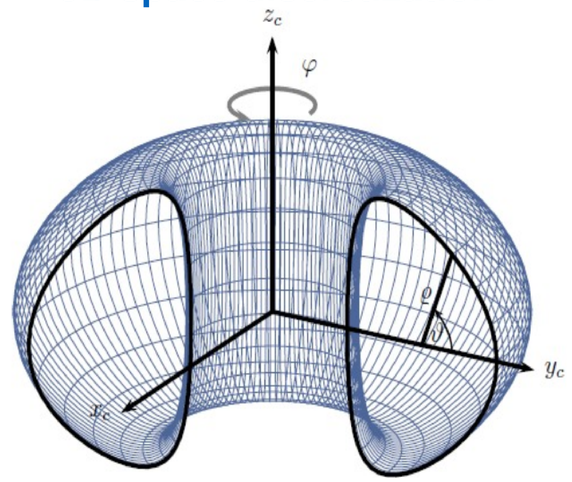


Linear gyrokinetic problems

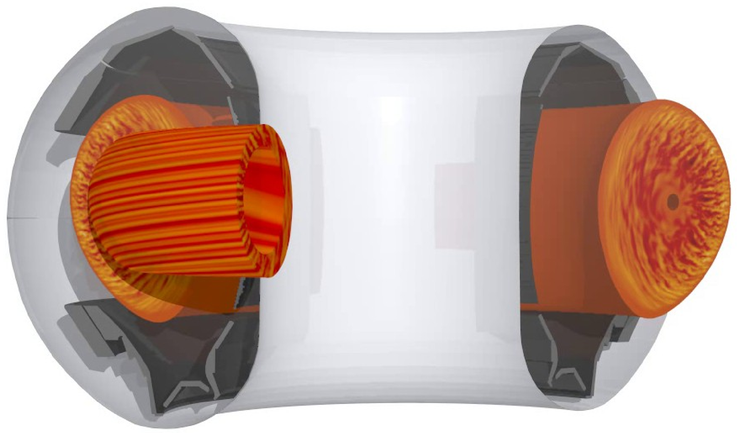




5D space discretization



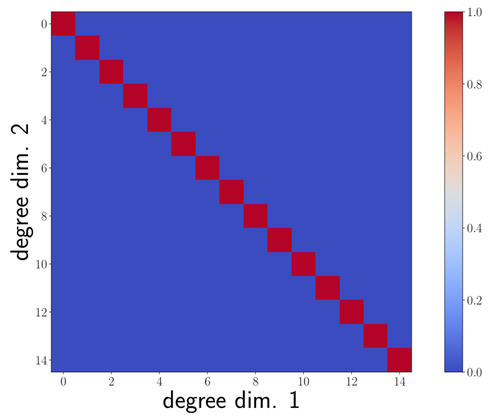
Global gyrokinetic simulation of turbulence



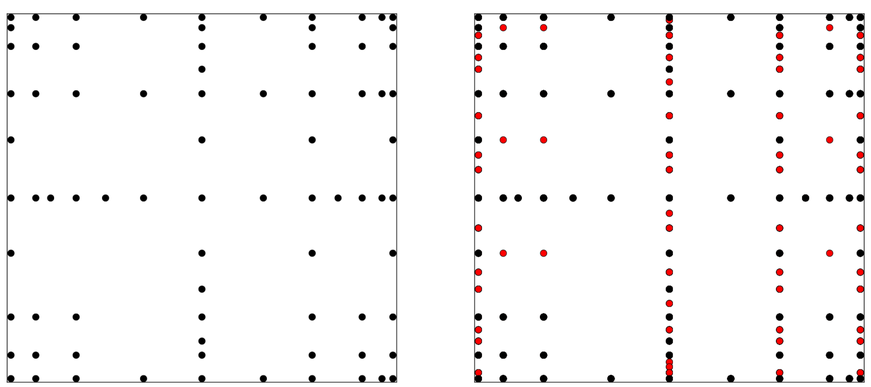
Sparse pseudo-spectral spectral projection

sparse approximation based on projection operators

internal aliasing error-free projection spaces



Leja points



(Some) Results

real-world application, 11 stochastic parameters

> 14000 CPU hours only for preliminary results