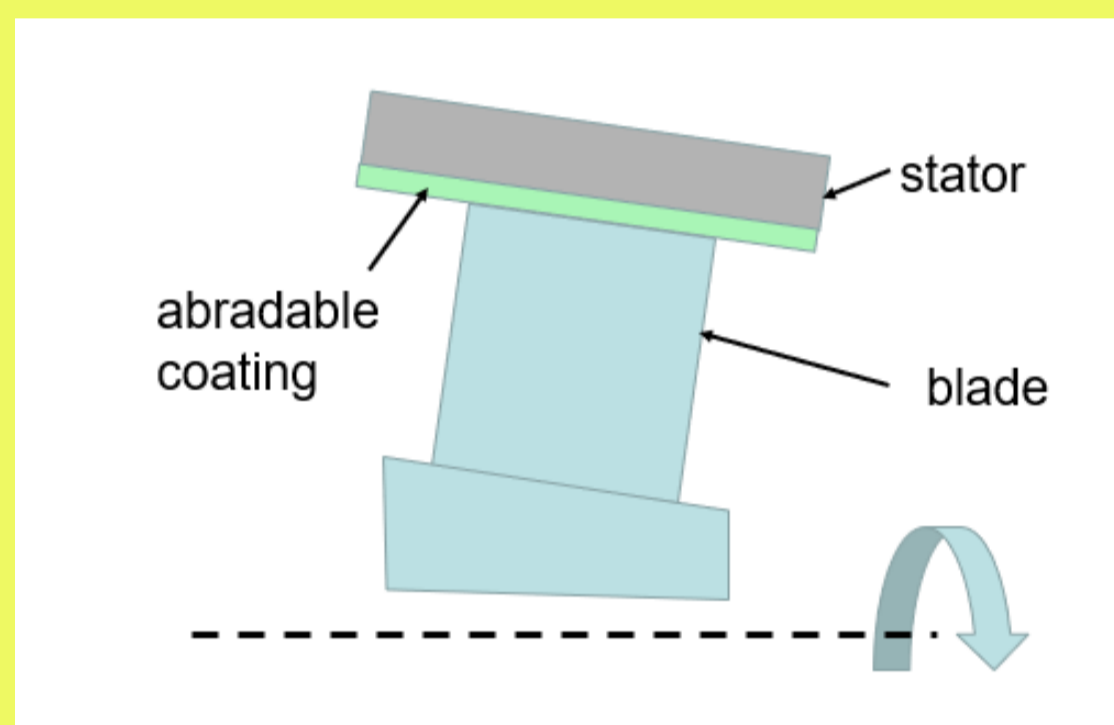


Lab Scale Incursion Facility



What if turbine blades touch the housing?

Abradable coatings are applied to the stator of gas turbines and aircraft engines to reduce the clearance between blade tip and stator. In case of a contact, the abradable coating is scraped, but no damage occurs to the blade. But how are these coatings tested?



Goal of the project:

- Development of a small test facility, to test abradable coatings
- Calculation of rotating parts to ensure a safe operation
- Creation of an assembly manual for the facility

3 Abradable

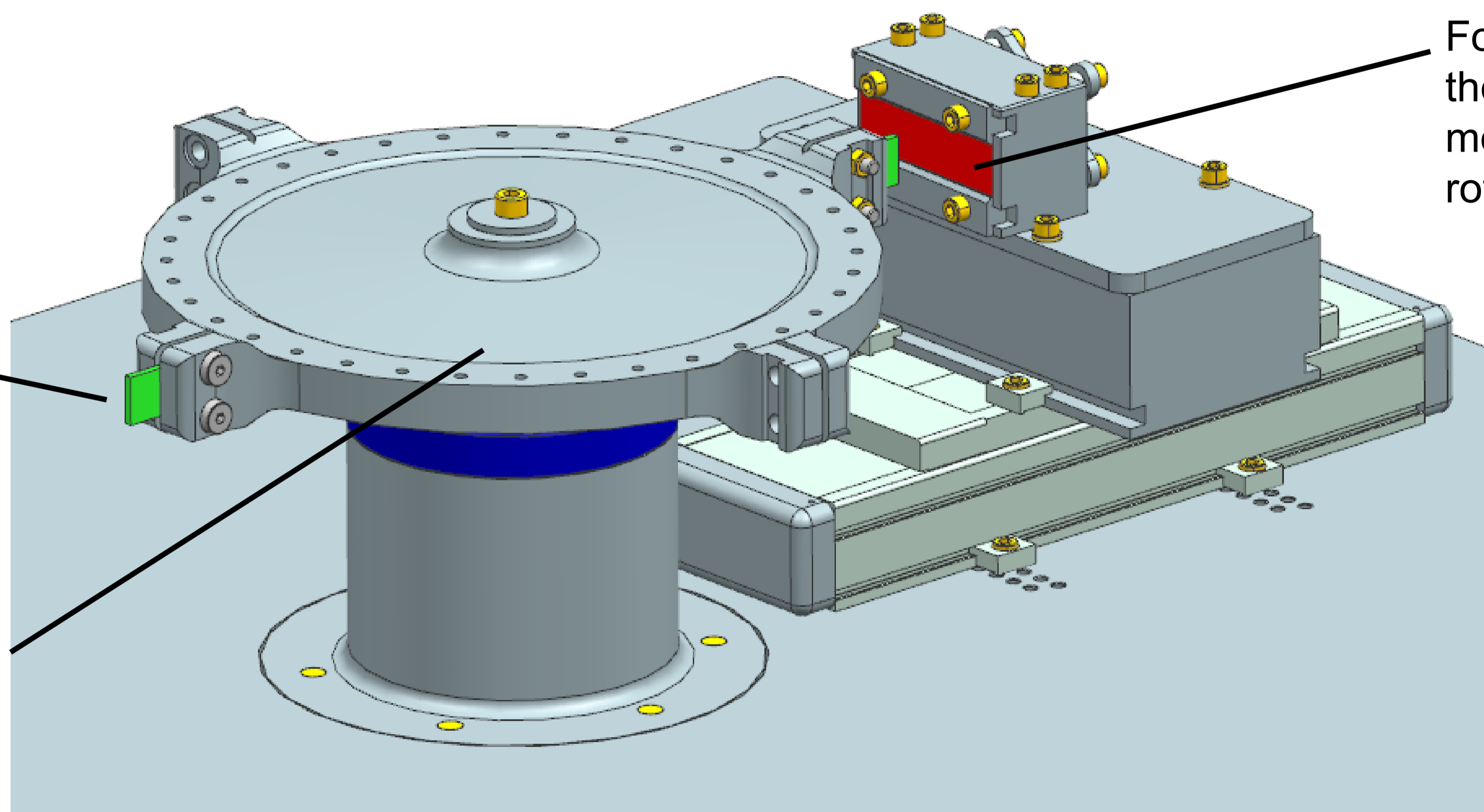
For the test procedure, the abradable coating is moved slowly towards the rotating blade.

1 Blade

The blade rotates with a tip speed of up to 410 m/s or 19'600 rpm.

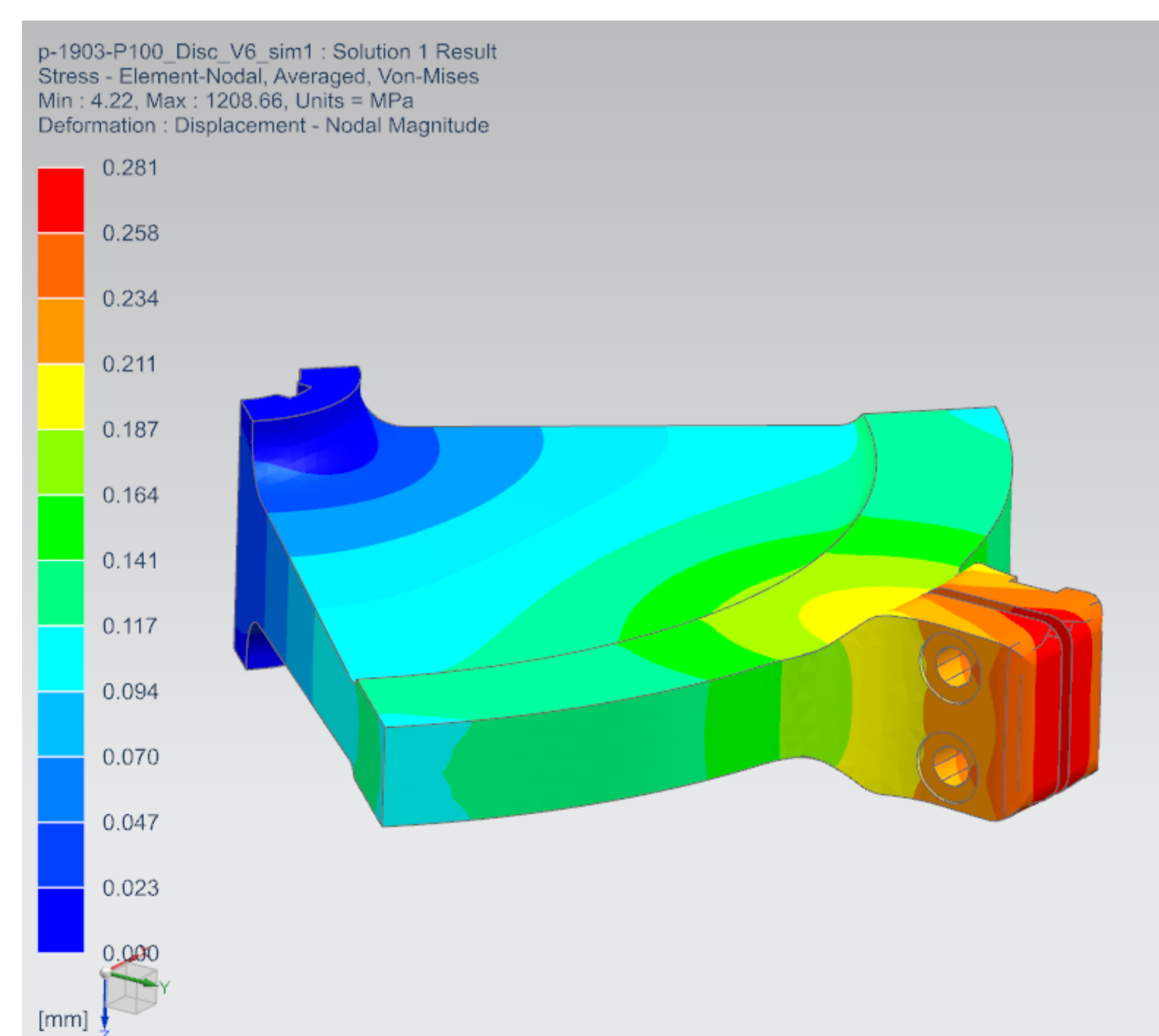
2 Disc

The high rotation speed requires a tempered steel disc. The holes at the top of the disc are for balancing.



FE-calculation

The rotation speed leads to high requirements of material and connections. Therefore, all rotating parts had been calculated with Finite Element Method (FEM). Especially the disc is a critical component and required some adaptations. For proper test results, the deformation of the disc must be only radial and not axial. This led to a complete symmetric disc.



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References

