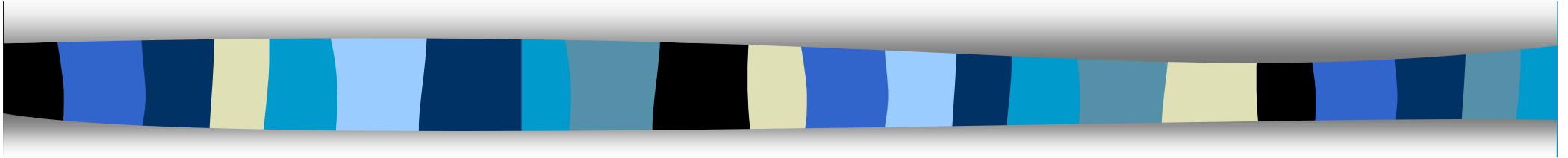


# Spherical Induction Motor



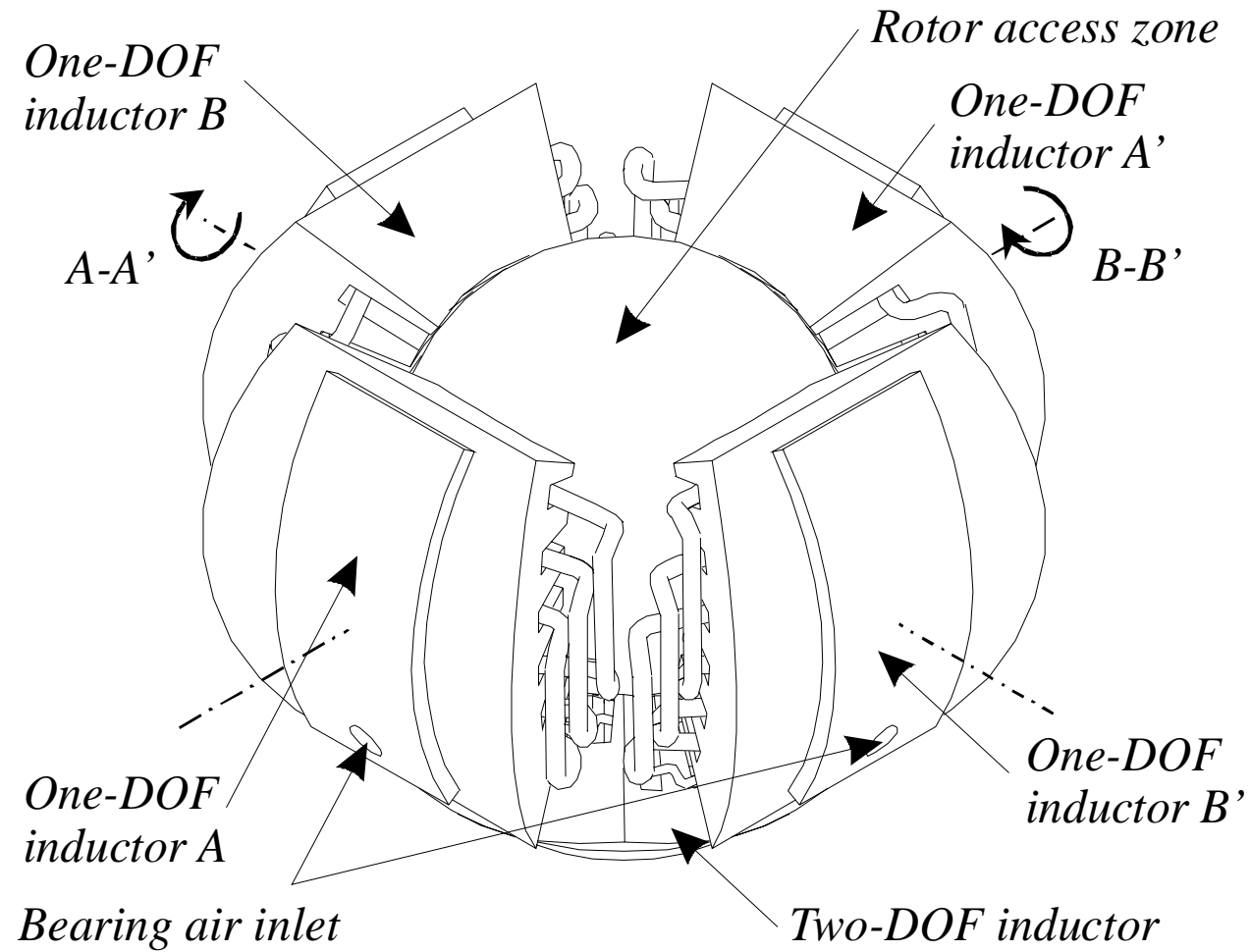
Grzegorz GALARY

Damien GRENIER

Center for Research in Mechatronics  
Université catholique de Louvain, Belgium

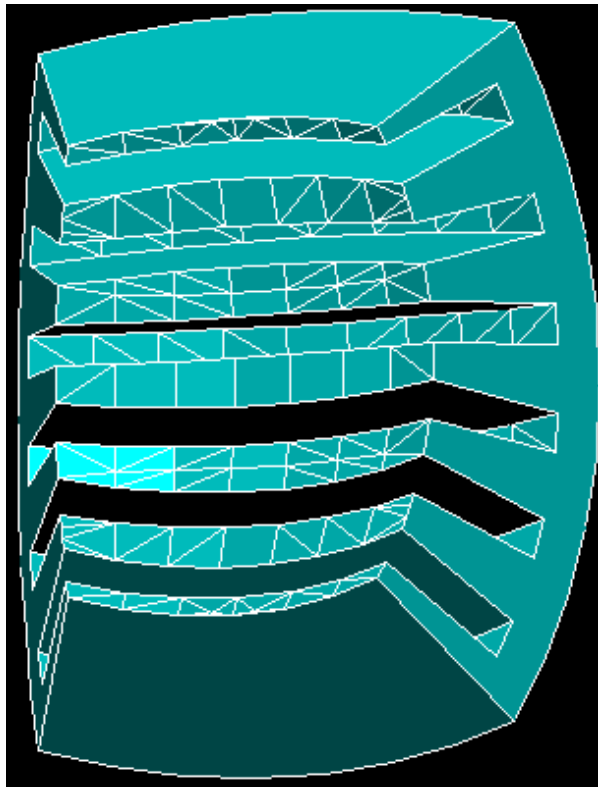
Motor Design Day at Eindhoven University of Technology  
26 February 2004

# Two-degree of freedom spherical actuator

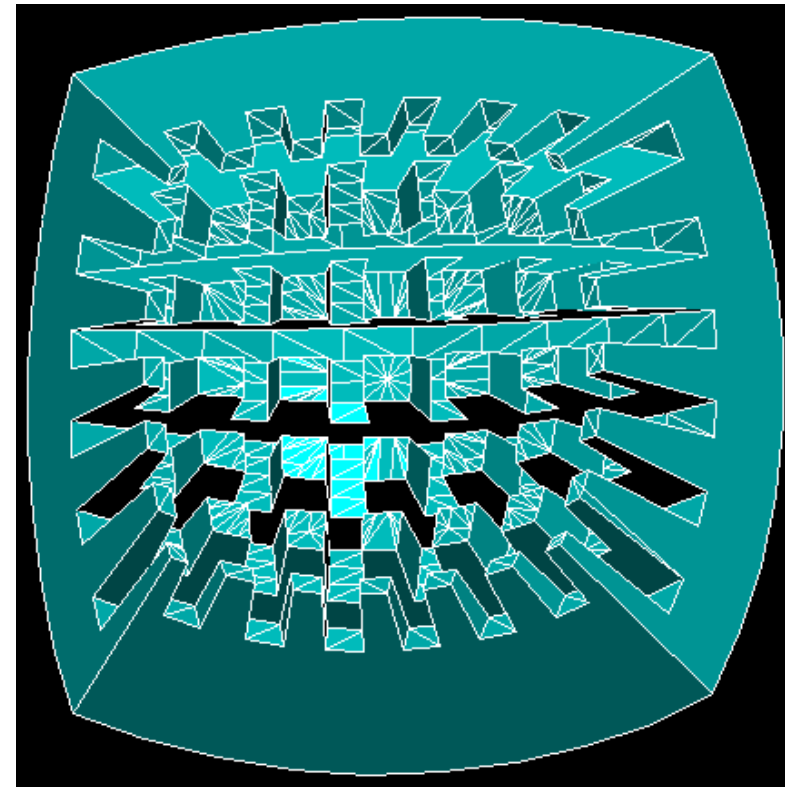


# Two-degree of freedom spherical actuator

- One-DOF inductor

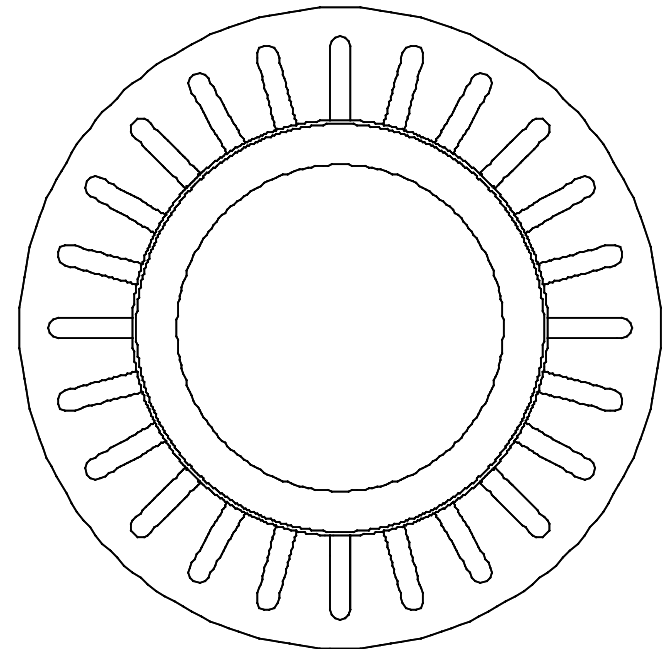
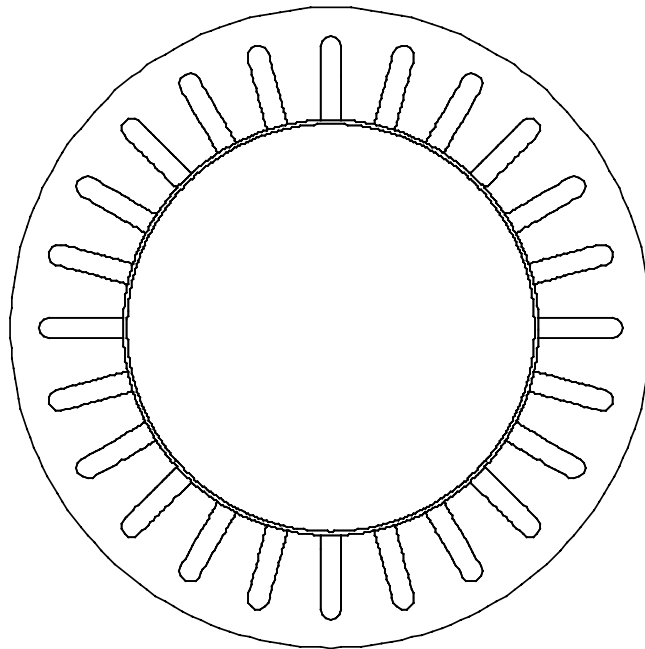


- Two-DOF inductor



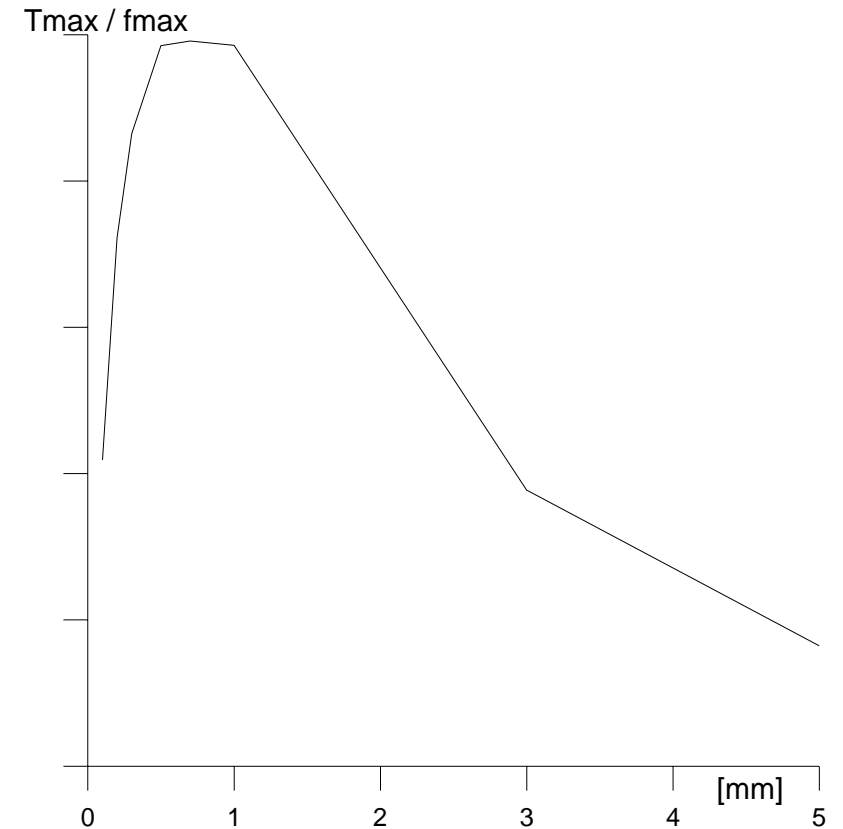
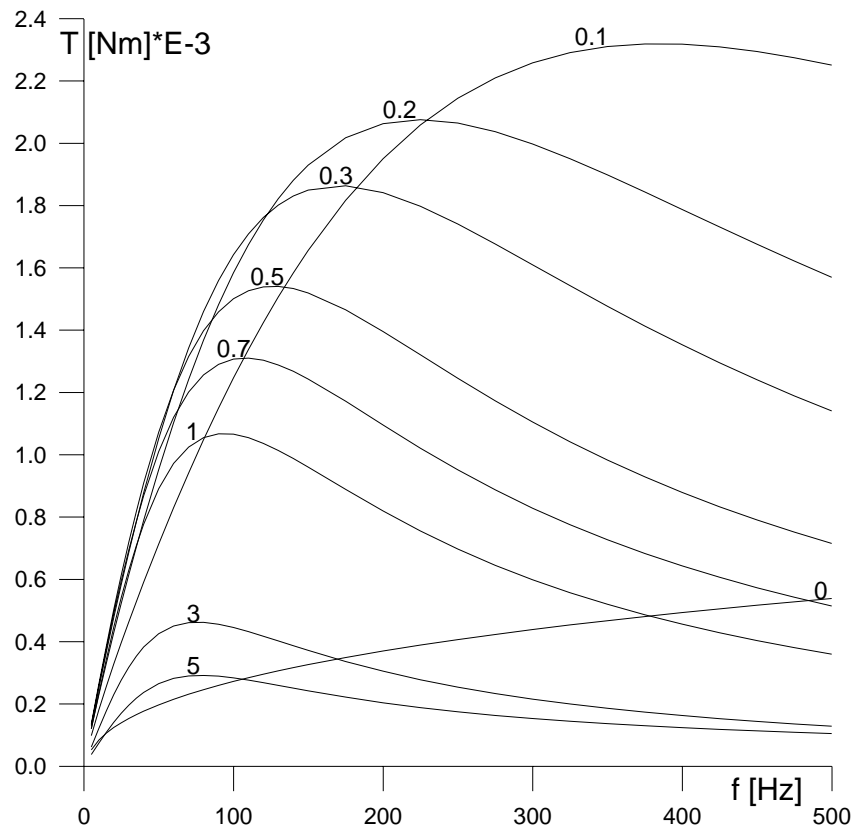
## One-layer versus two-layer rotor – structures

- one-layer rotor made of steel
- two-layer rotor made of steel and copper
- 24 slots in stator; 8 poles

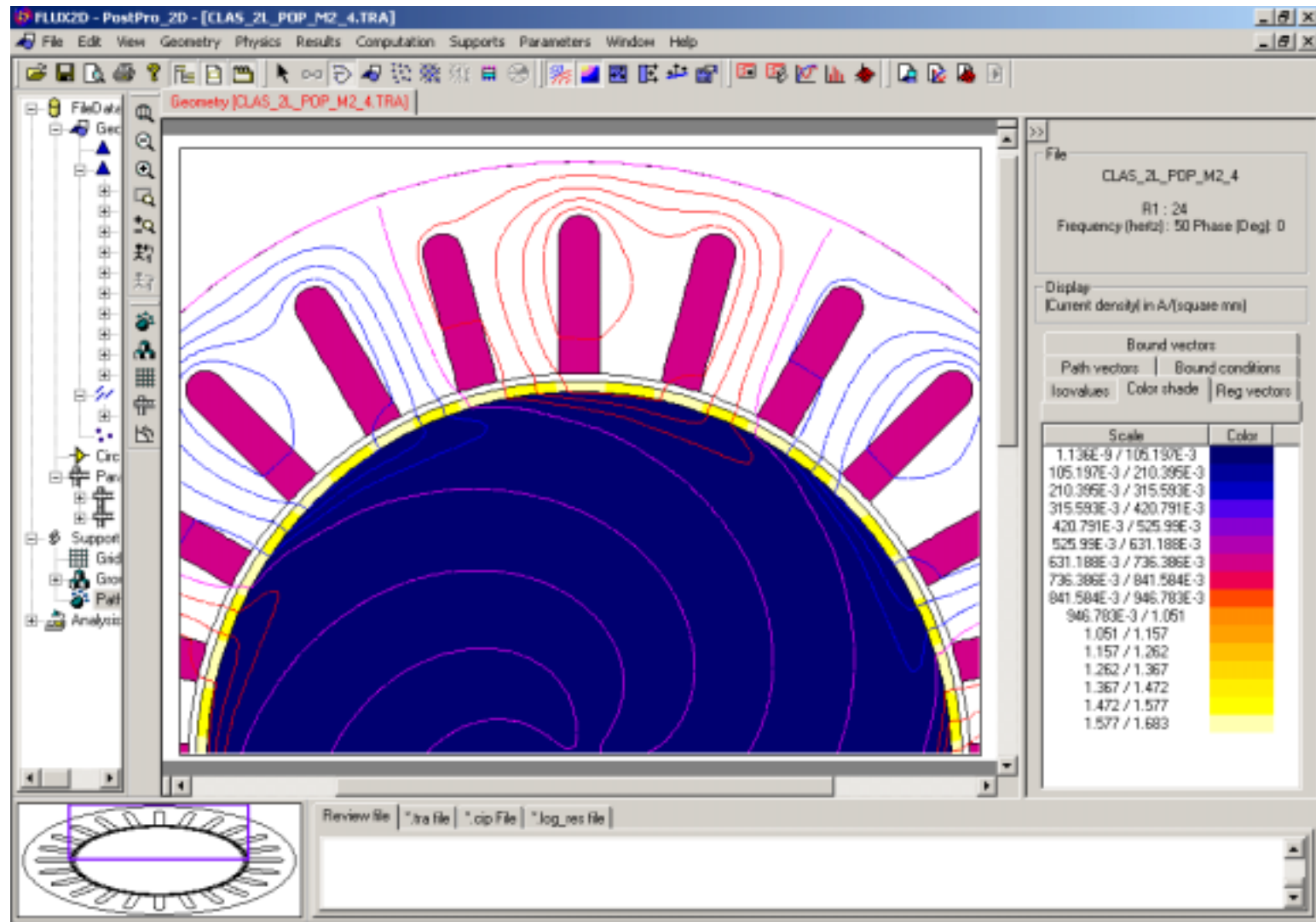


## One-layer versus two-layer rotor – results

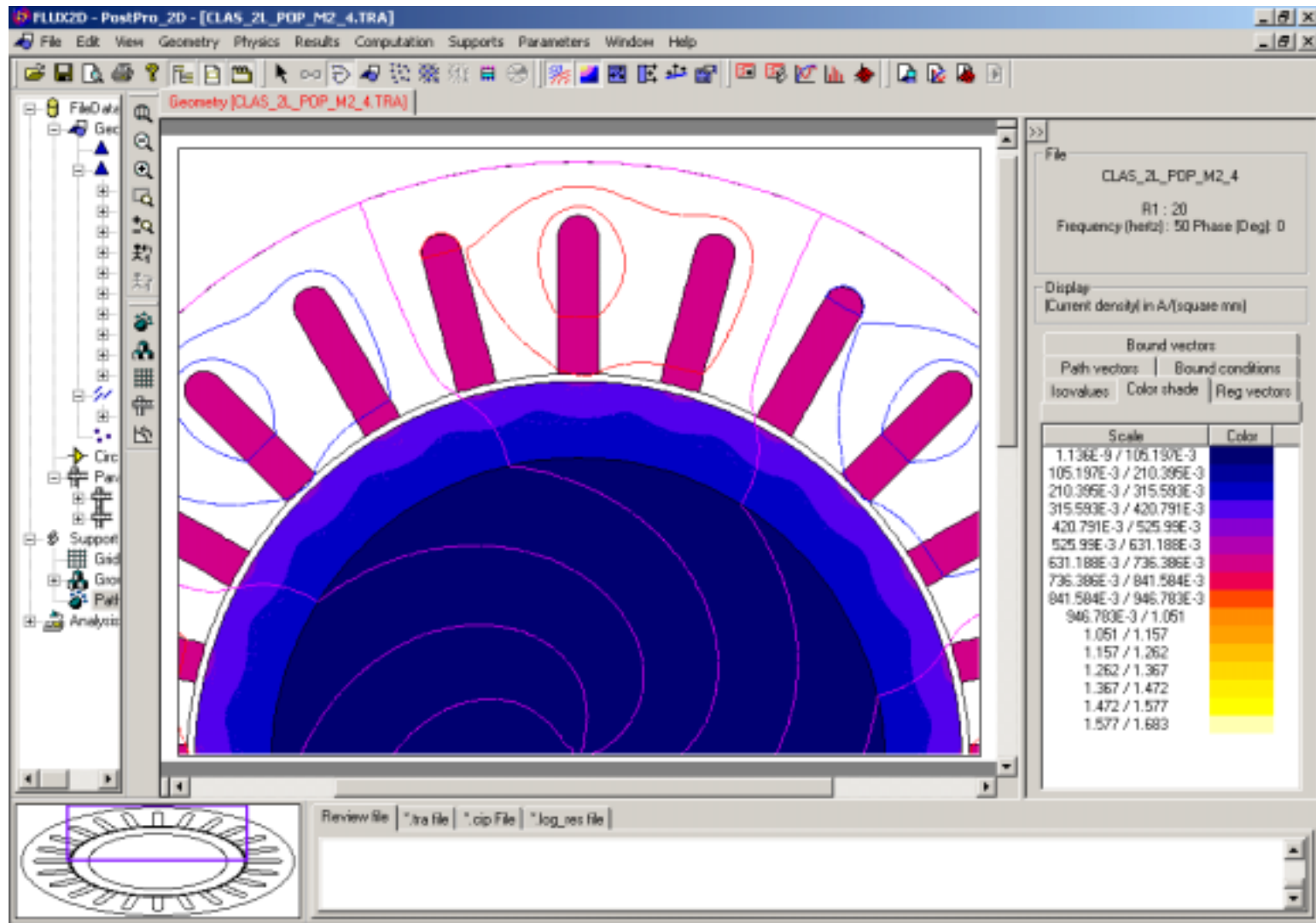
- characteristics torque-speed in a function of the thickness of rotor external layer



# One-layer versus two-layer rotor – explanation

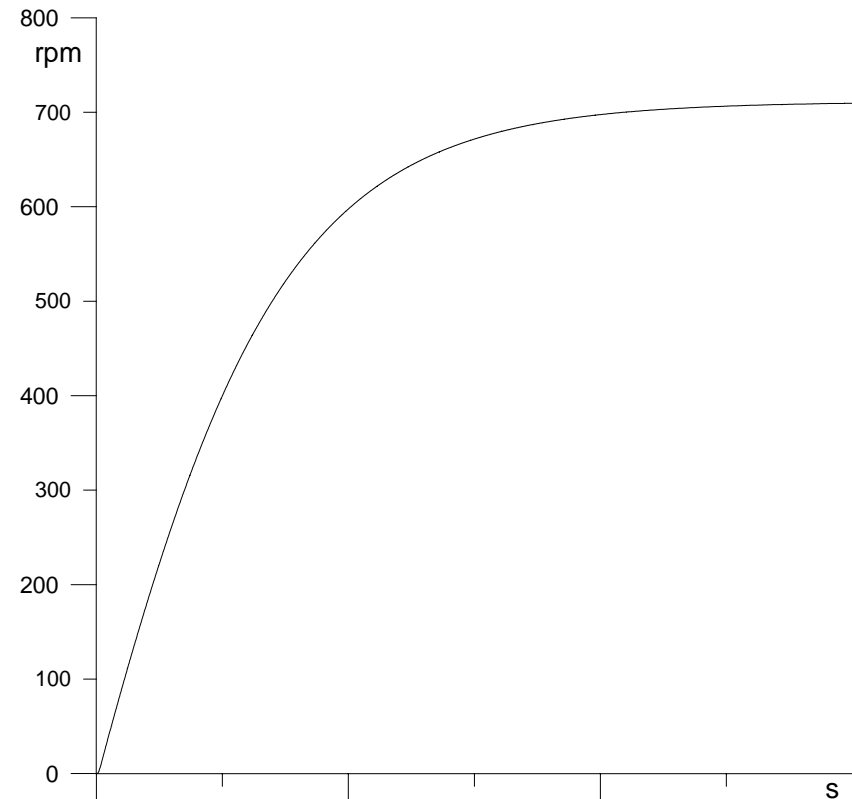
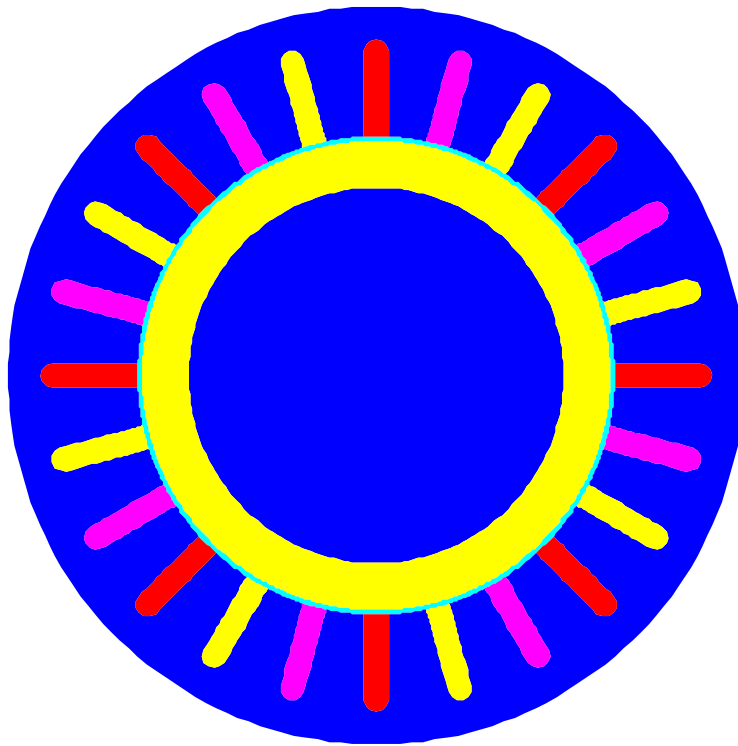


# One-layer versus two-layer rotor – explanation



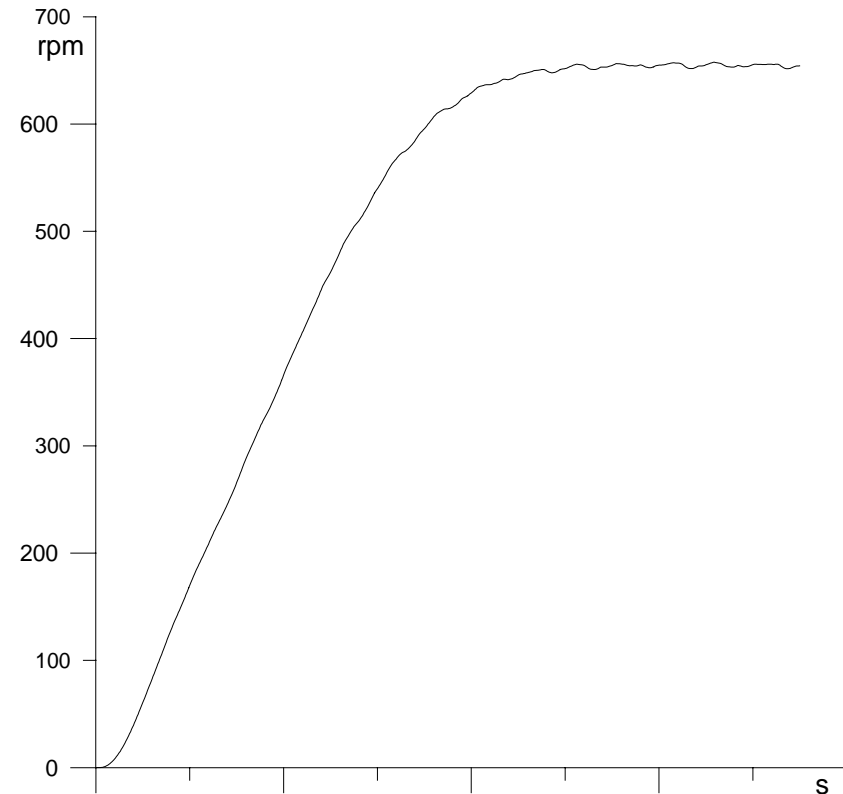
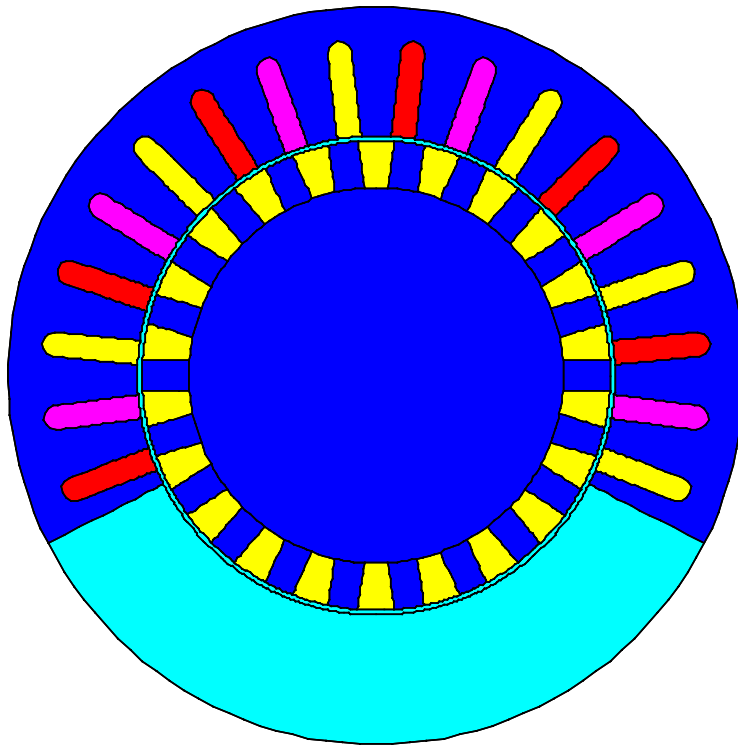
## Two-layer rotor – no load start-up

- achieved speed of 710 rpm instead of synchronous speed of 750 rpm – 4 pairs of poles

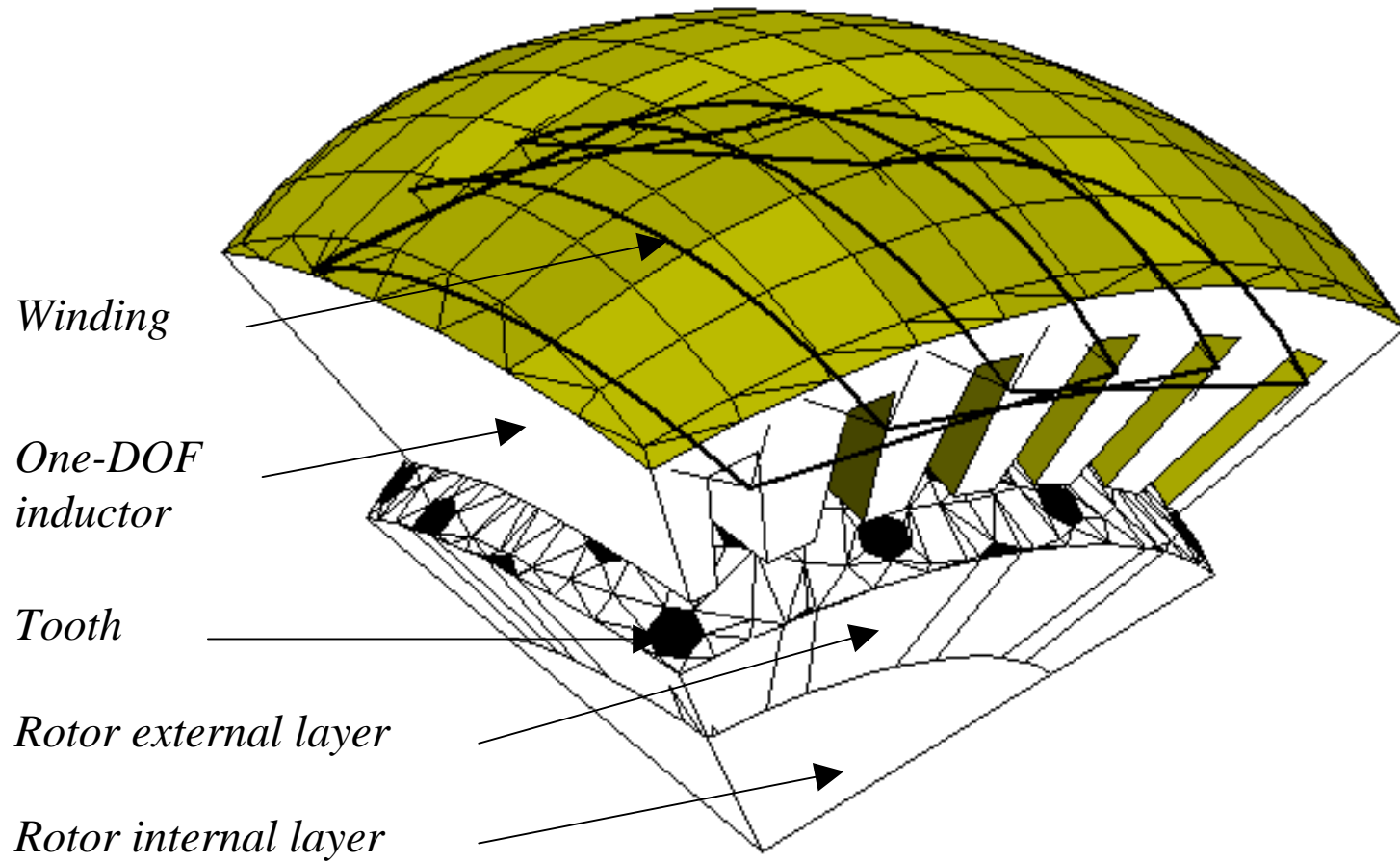


## Two-layer rotor with teeth – no load start-up

- achieved synchronous speed of 650 rpm –  
4.6 pairs of poles

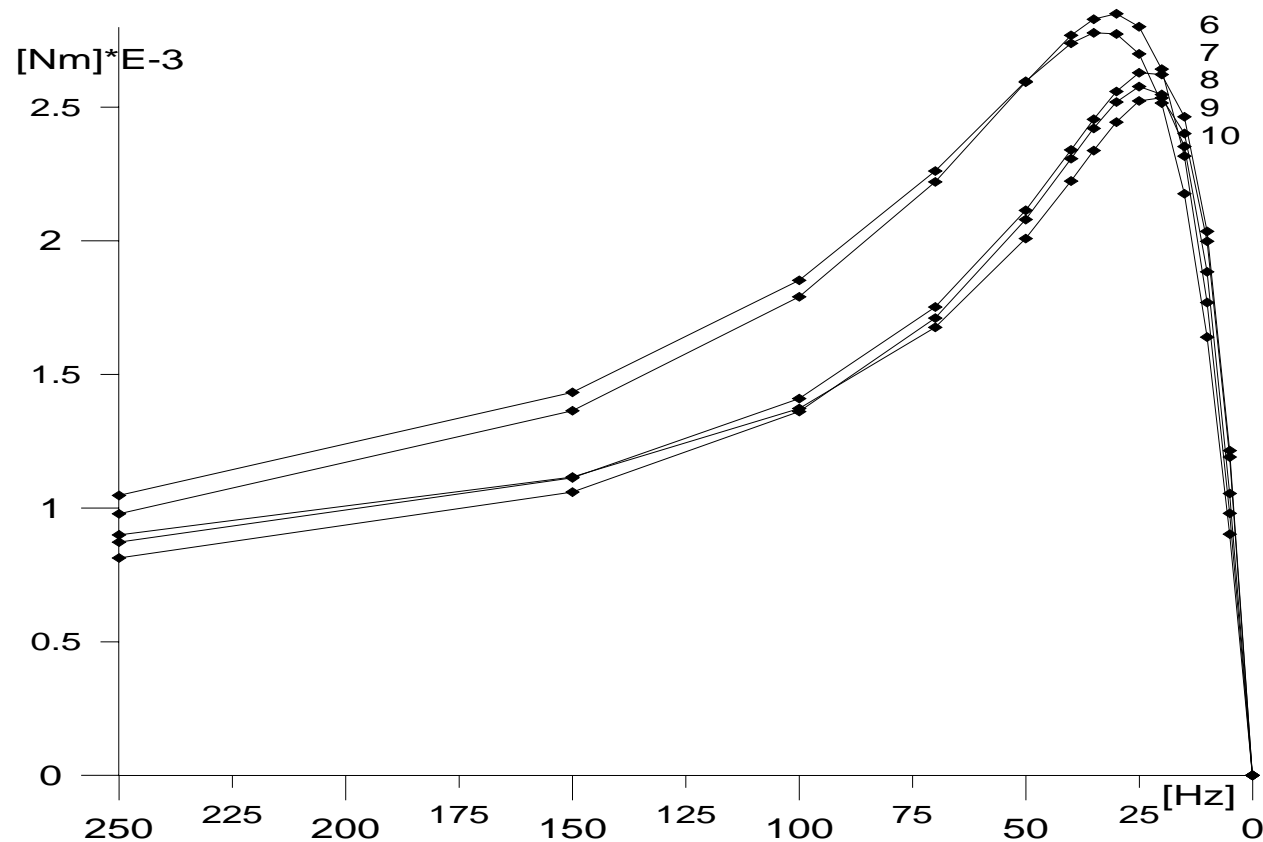


# Rotor's teeth optimisation – structure



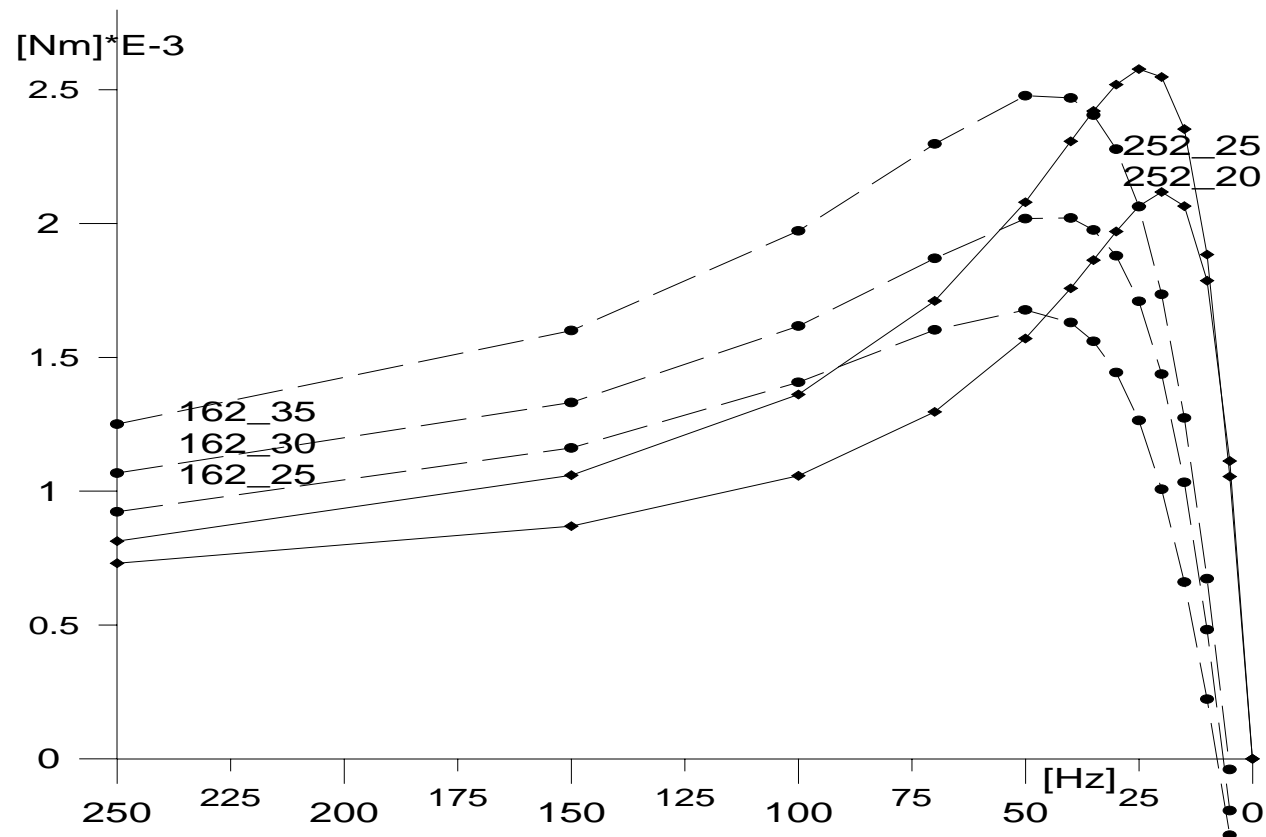
## Rotor's teeth optimisation – results

- characteristics torque-speed in a function of the thickness of rotor external layer



## Rotor's teeth optimisation – results

- characteristics torque-speed in a function of 'teeth' total number and their diameter



# Rotor's teeth optimisation – slot effect

