



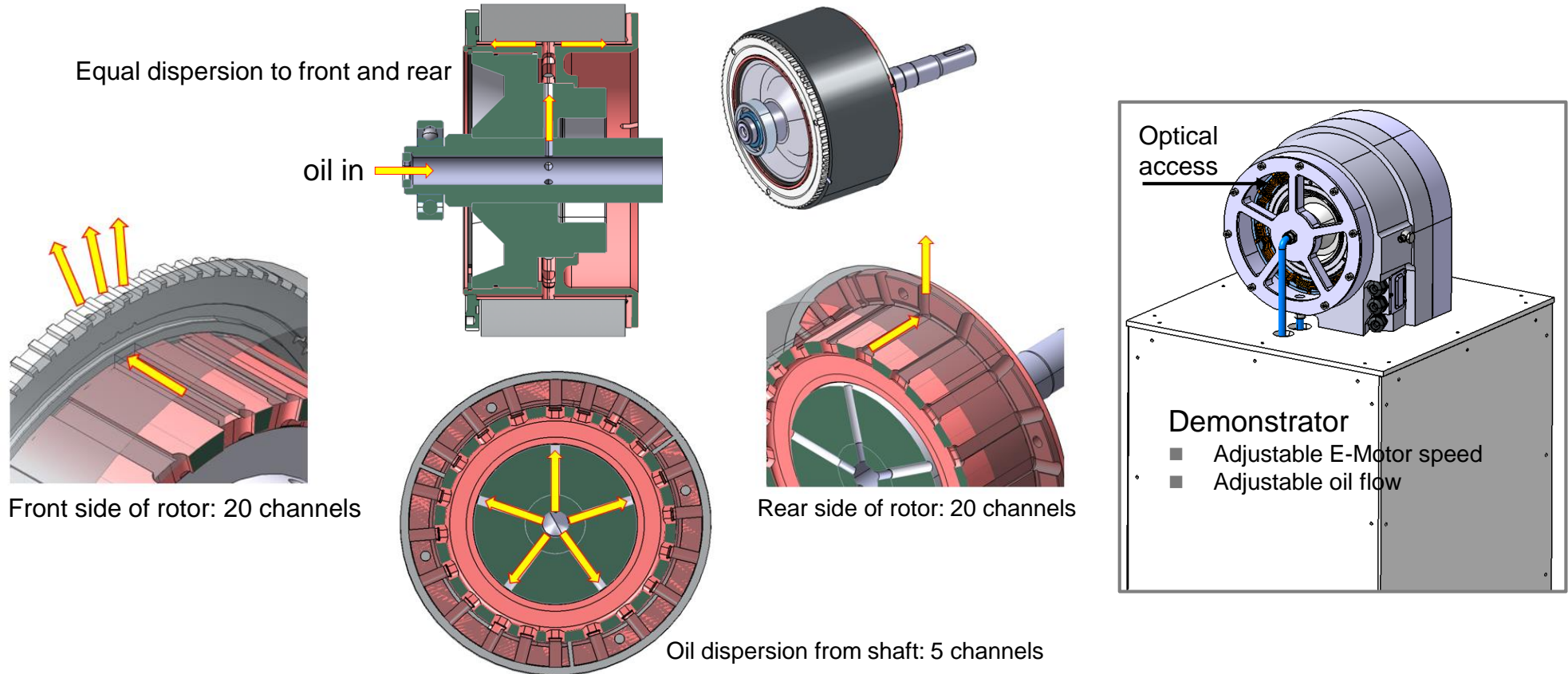
FEV oil cooled e-motor for Electric Drive Unit



Berlin, Dezember 2019
CTI Symposium



OVERVIEW OF CENTRIFUGAL OIL COOLING



Section and isometric view of rotor assembly, direction of the oil flow is shown by the yellow arrows

Centrifugal oil cooling for best efficiency and poweroutput enabling further downsizing of e-motor / EDU

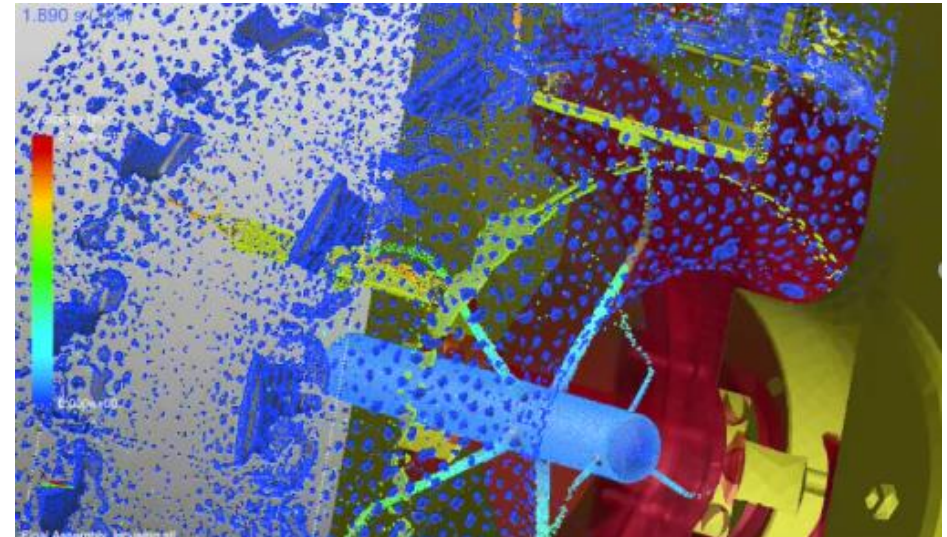


OIL DISTRIBUTION ANALYSIS CAE SIMULATION

Optical e-motor



Droplet simulation of oil distribution



- Up to 50% increase in continuous torque / power
- Significantly faster recovery after operation in peak torque region
- Power to weight ratio ~ 3 kW/kg (including inverter and transmission)

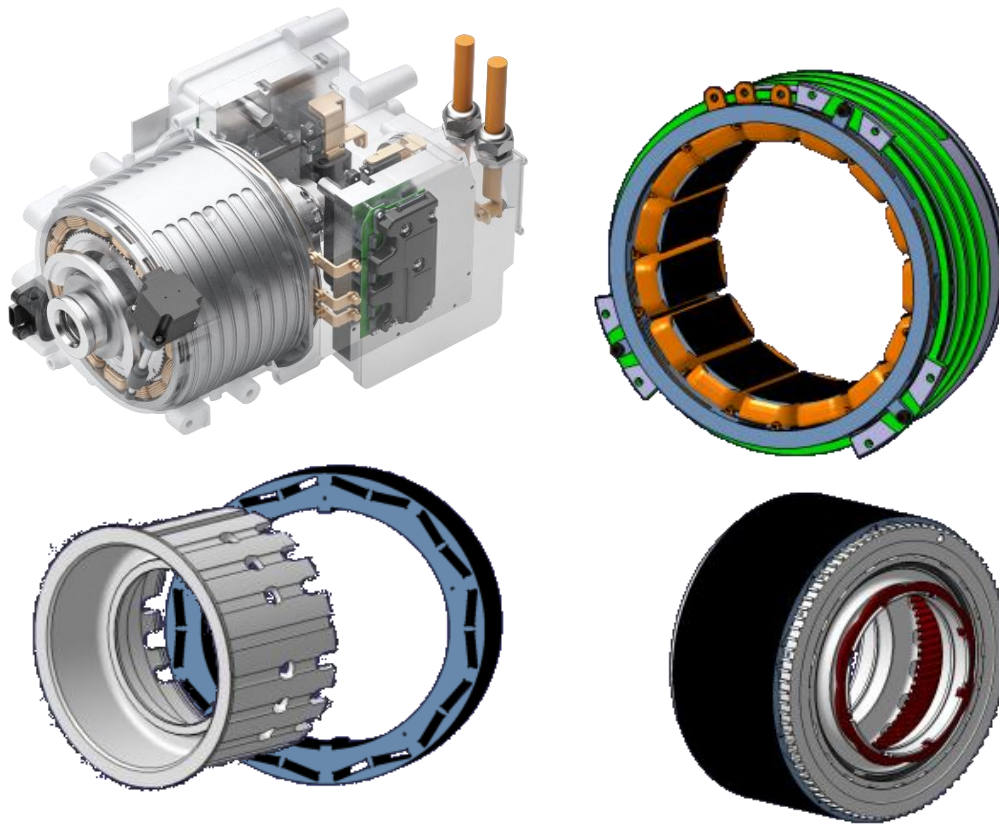


FEV E-Motor Development

E-Motor for Electric drive System



PM E-MOTOR FOR ELECTRIC DRIVE UNIT



EDU Motor

- Three Phase AC PM Motor with 5 pole pairs
- Peak Torque of 357 Nm
- Max Speed ~11200 rpm
- Peak Power 100-240 kW, Continuous 80-180 kW (depending on installation)
- Liquid stator water cooling
- Demonstrated centrifugal oil cooling
- FEV patent pending rotor and magnet cooling
- Reduction gear set inside Rotor
- Magnetic, Thermal and Fatigue designed by FEV
- Multi-Phase Motor for high power variants by dual IPU
- Innovative Park-Lock and neutral actuator