

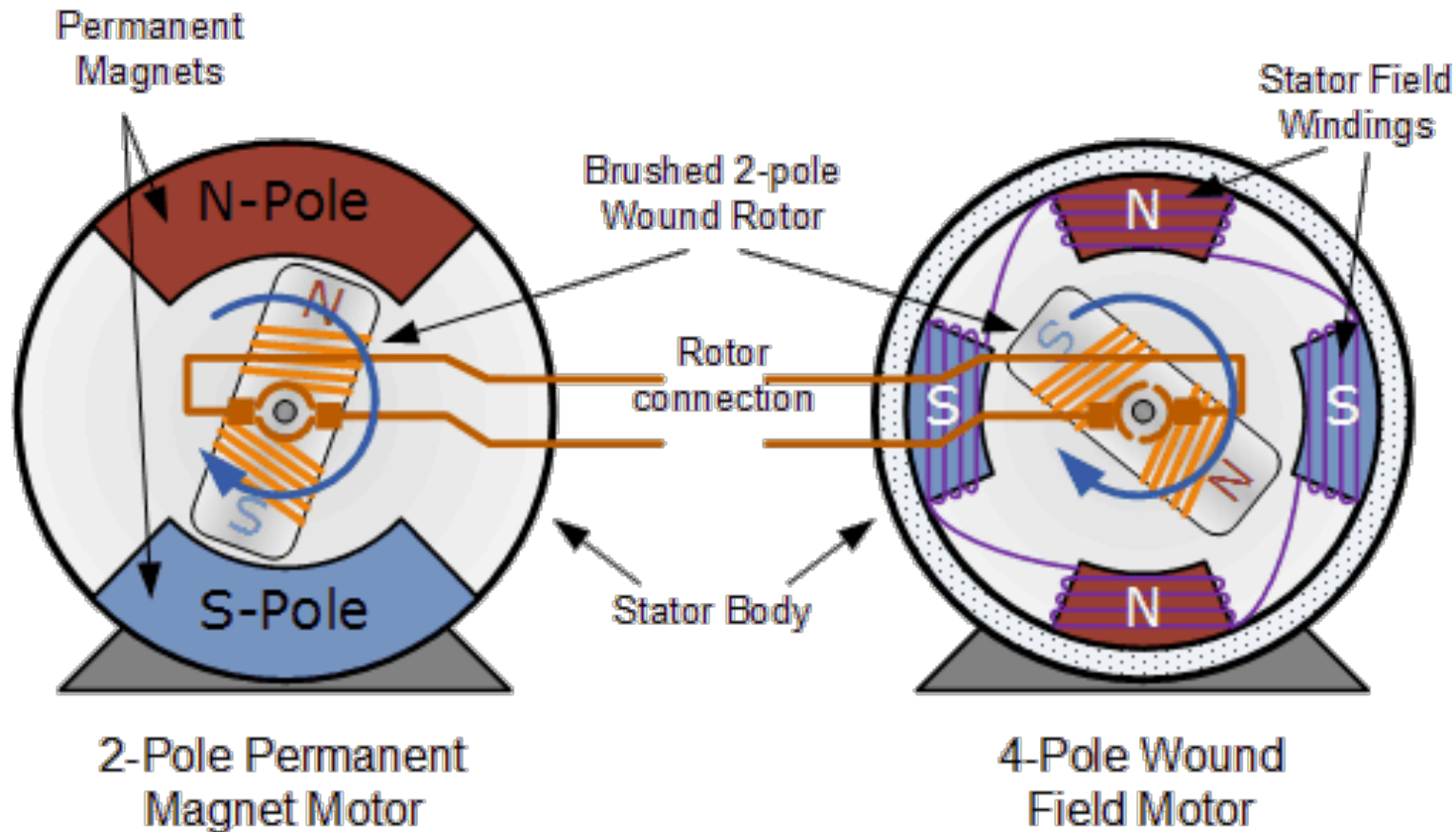
# **ROCO222: Intro to sensors and actuators**

## Lecture 3

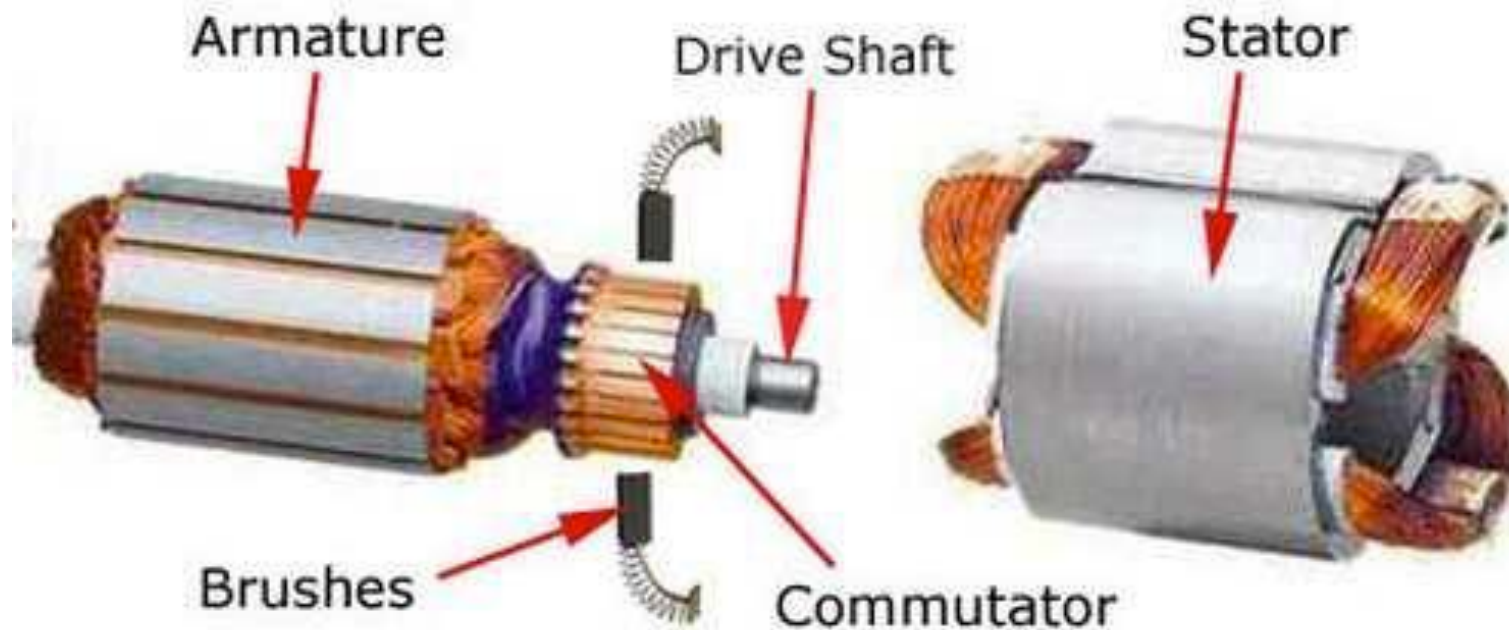
### Some other motors

# Wound field motors

- What happens if we apply AC to a permanent magnet DC motor?



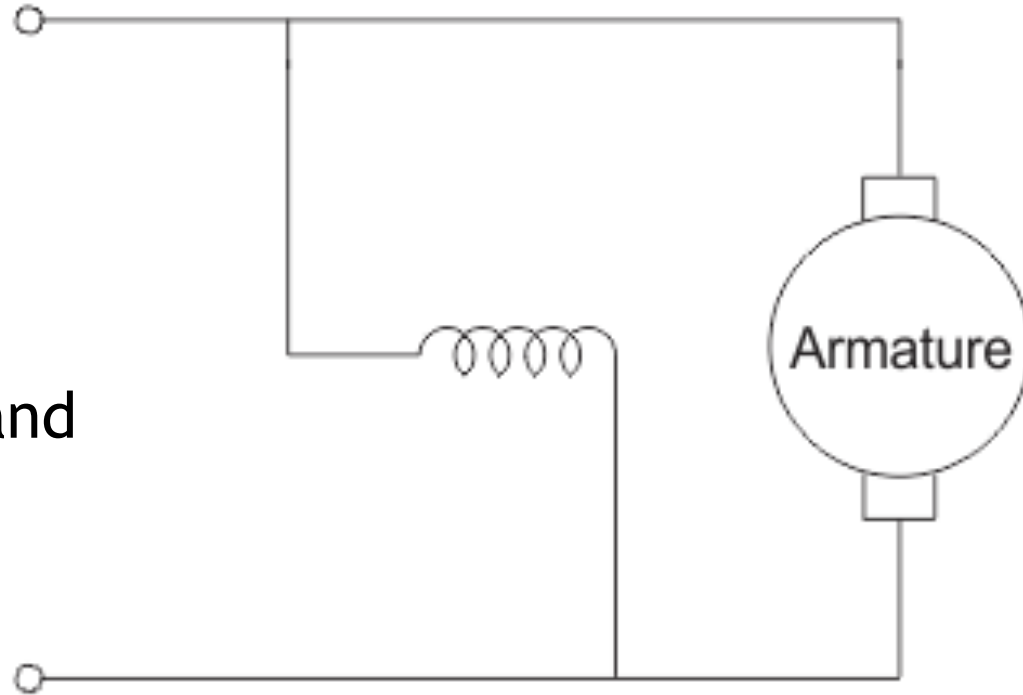
# Motor with stator winding



# Shunt motor

- Like DC motor but with electromagnet to generate static field

- Armature and field windings are connected in parallel
- Separate current through stator and armature
- Low Starting Torque
- Good Speed Regulation
- Used for fixed speed applications, windscreen wipers, fans

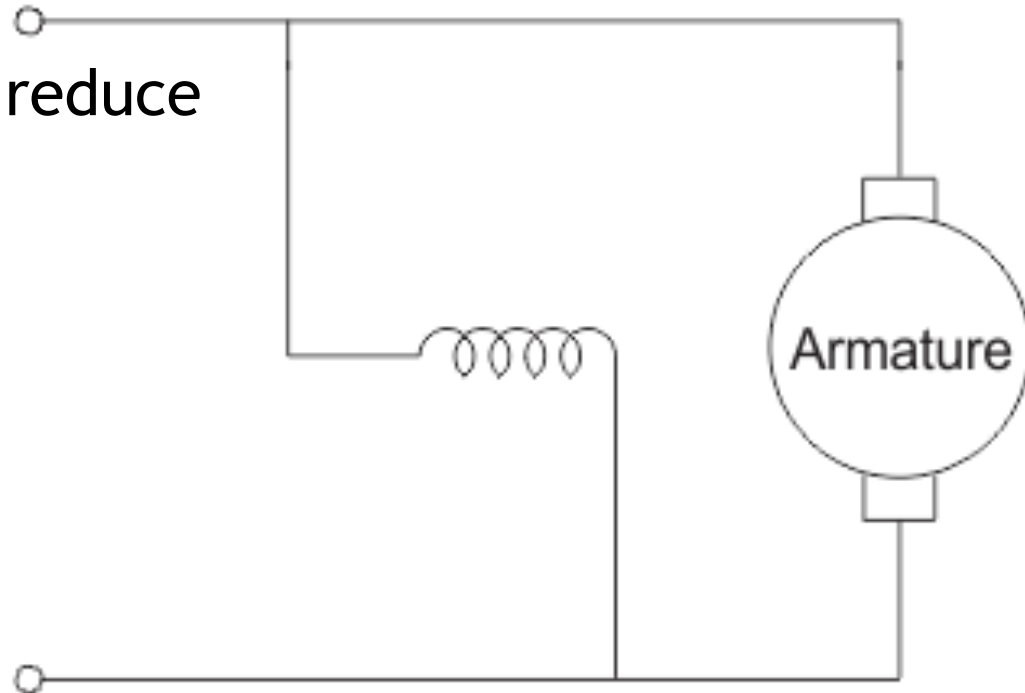


Shunt Excited DC Motor

# Shunt motor

Consider motor behavior under load:

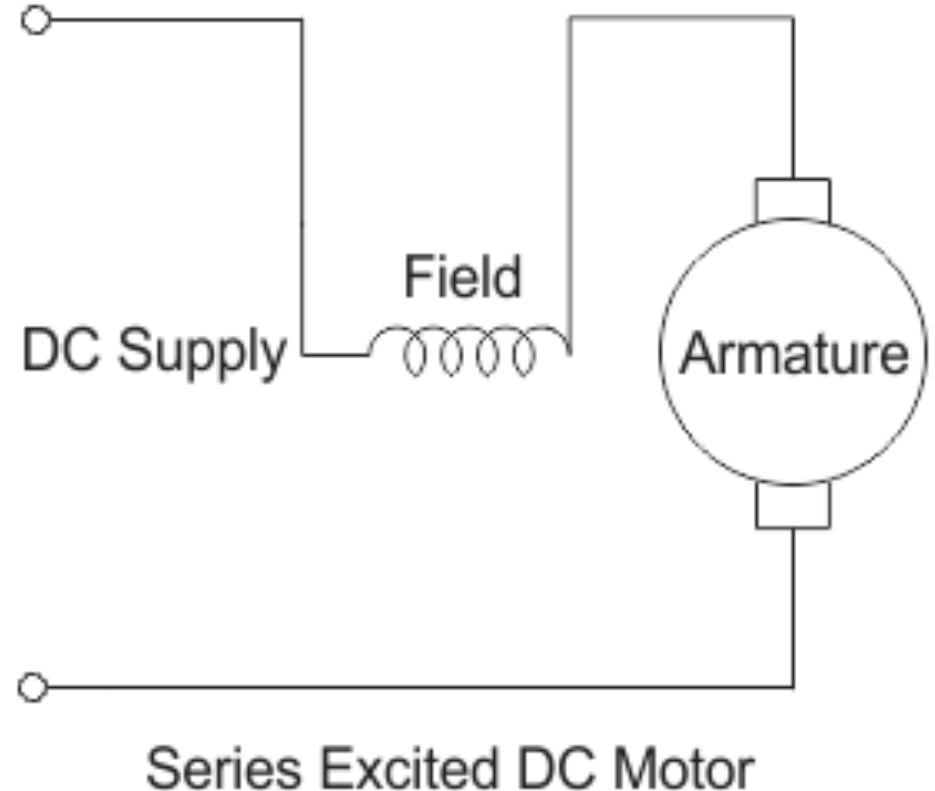
- On application of load speed will reduce
- But this reduced armature EMF
- Therefore armature current rises
- Therefore torque increases
- So speed increases too
- Therefore system can do some self regulation of speed
- Much like permanent magnet DC motor!



Shunt Excited DC Motor

# Series motor

- Armature and field windings are connected in series
- Same current goes through both
- High Starting Torque
- As the speed builds up so does the back EMF, reducing the current, which causes a reduction in torque
- Poor Speed Regulation
- Used for starting heavy, industrial, high torque loads such as cranes, hoists, elevators,



# Universal Motors

- Series motor
- Uses field coils and not permanent magnets
- AC and DC operation
- As current direction changes it changes field direction on stator field and also armature
- So always rotates in same direction independent of applied current direction

