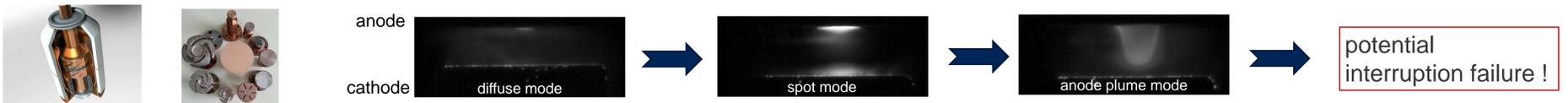
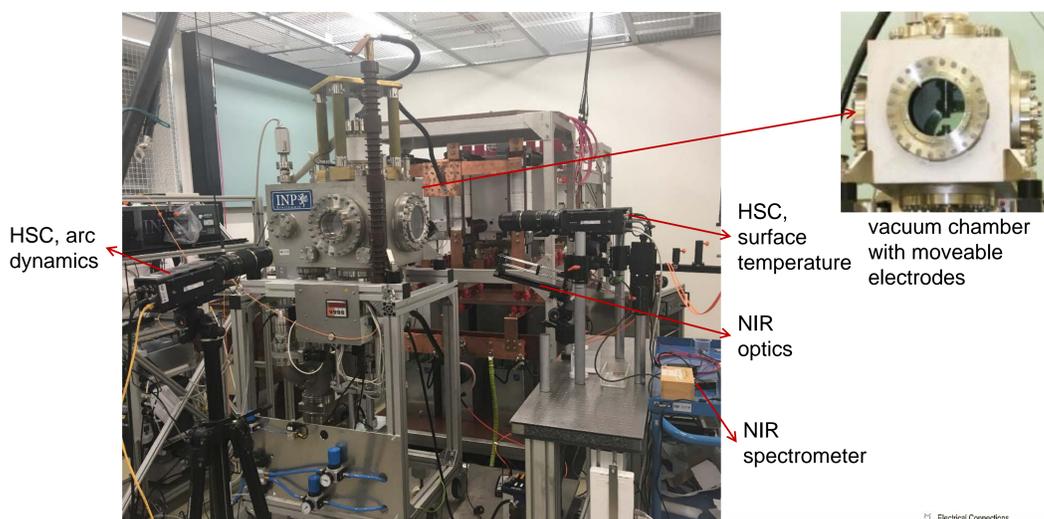


MOTIVATION

- Advances of vacuum switching devices: simple design, environmentally friendly operation – zero emission (no harmful gases, no light emission, no waste products)
- Dual role of electrode evaporation: source of the switching medium (metallic vapour), but shorter lifetime due to local electrode surface overheating → reduction of switching capacity in case of too high vapor density after current termination
- High neutral metal vapor density caused by anode activity: control over the arc constriction and over anode thermal load is necessary
- Understanding of constriction phenomena during high-current operation through detailed characterisation of arc constriction process

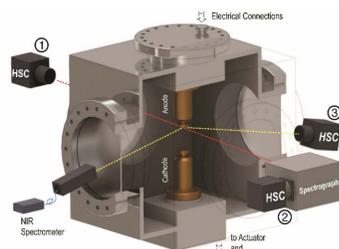


EXPERIMENTAL SETUP



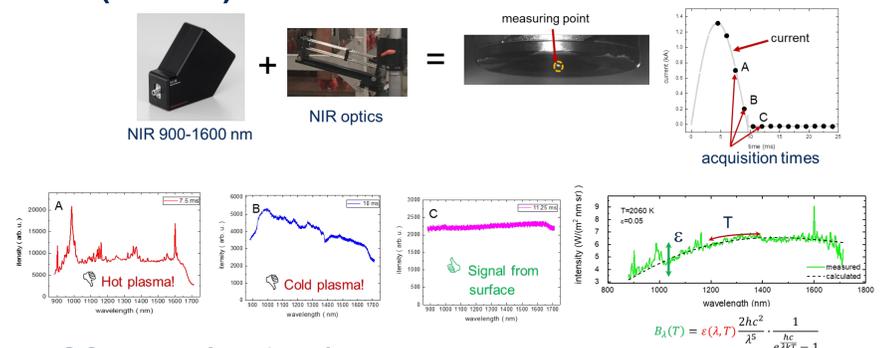
Wide use of optical diagnostics

- arc dynamics – high speed camera (HSC)
- plasma parameters - intensified video OES (iVOES)
- electrode surface temperature – high-speed imaging with narrow-band filters and NIR spectroscopy

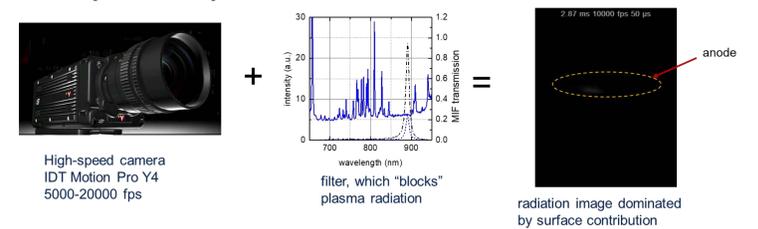


DIAGNOSTICS

NIR (surface)



HSC + MIF (surface)

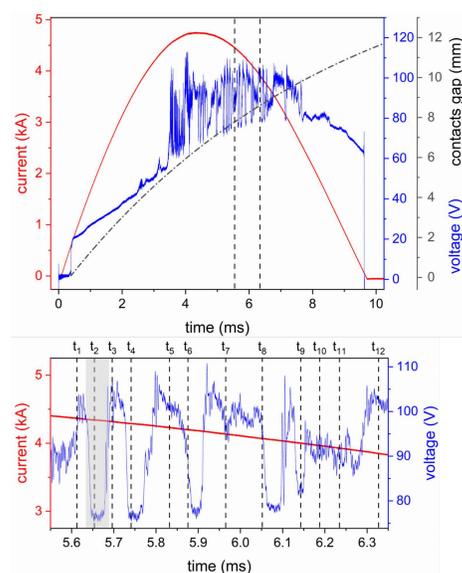


iVOES (arc plasma)

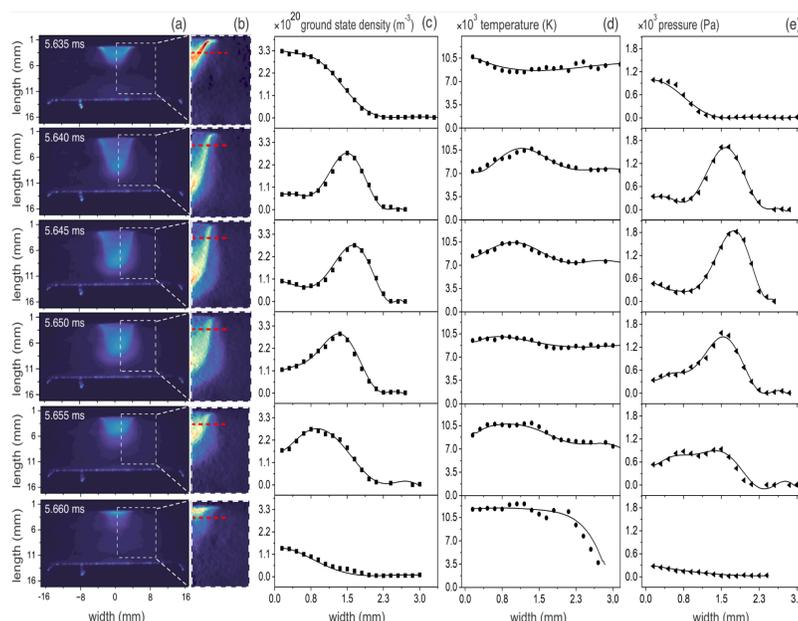


RESULTS

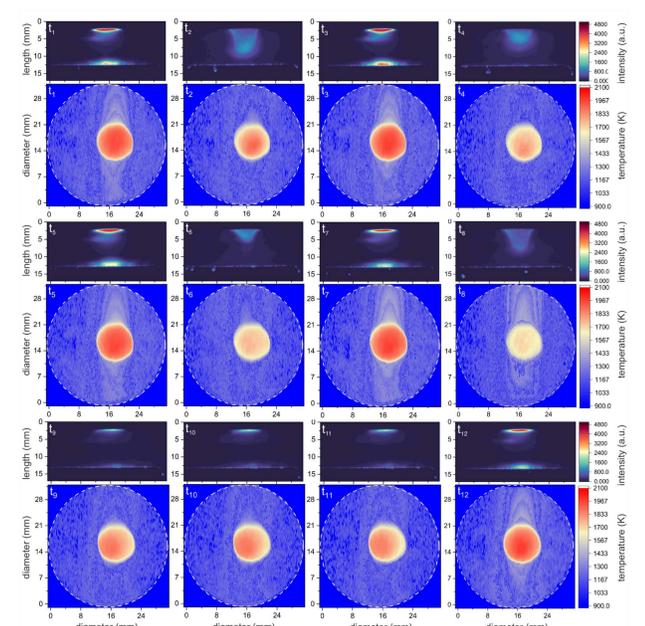
electrical signals



spectra analysis



surface temperature



- Multiple mode transitions with typical time less than 5 μs
- Current path influenced by anode plume
- Lower anode surface temperature during anode plume mode
- Clear correlation between voltage jumps/falls and anode surface temperature