

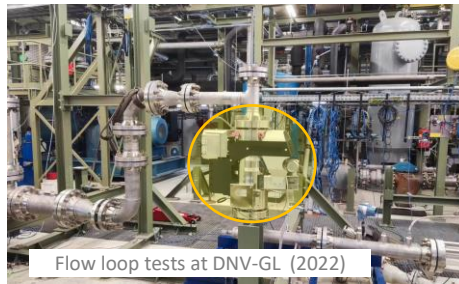
Going Nonradioactive after 25 Years of Successful Multiphase Metering

Cheng-Gang Xie, SLB

Guillaume Jolivet, Fuad Zain, Rebecca Comley,
Bertrand Theuveny, SLB

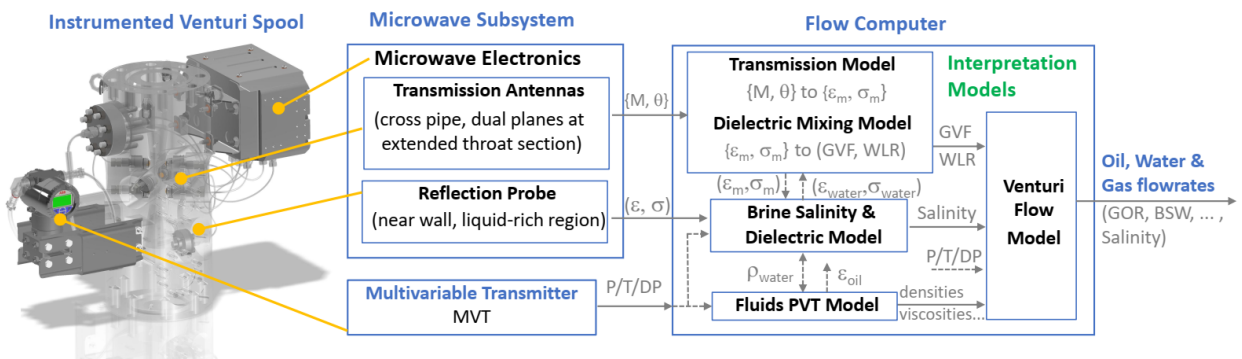
• New-generation nonradioactive MPFM based on microwave-Venturi

- Technology bricks from downhole-logging dielectric dispersion service and a water salinity sensor
- Metrological performances evaluated at in-house and third-party ISO17025-certified flow facilities
- Building on years of research and engineering, and one year of successful field tests



• Single-modality microwave transmission and reflection measurement system

- Seamless, rapid measurement of permittivity (ϵ) & conductivity (σ) for oil- & water-continuous gas-liquid flows
- Online brine salinity tracking from water-rich mixture complex permittivity measured near wall
- High-stability measurement capability from patented multiple transmitters-receivers configuration
- Multiple frequencies to optimize measurement sensitivity over wide-ranging WLR, GVF, and salinity
- Unique magnetic-dipole transmission antenna less prone to dielectric-window fouling



• Measurement system based on physics models

- Transmission model to calculate complex ϵ^* from magnitude (M) and phase (θ) measured at Venturi throat
- Proprietary interpretation models to calculate GVF, WLR, and flow rates, with little calibration requirement
- Fluids PVT model and Venturi flow model based on proven surface MPFM technology

