

# ST-FMR made easy

NanOsc Instruments releases a new spectrometer **PhaseFMR-20ST** that expands the company's well established and time-tested broadband ferromagnetic resonance (FMR) capabilities into the emerging area of spin-torque ferromagnetic resonance (ST-FMR) measurement and analysis.

Broadband **FMR** is particularly well-suited for studying magnetic thin films, which not only form the backbone of fundamental spintronics and magnonics research but are also constituents of current and future technologies focused on magnetic memories, sensors, logic, and microwave signal processing.

Broadband **ST-FMR** opens for analysis of spin-orbit torques (SOTs) typically observed in ferromagnetic/heavy metal (FM/HM) structures. Such analysis has attracted a growing attention in the application fields of SOT-based magnetic random access memories (MRAMs) and SOT-based spin Hall nano-oscillators (SHNOs) for on-chip microwave wireless communication and neuromorphic computing.

## Key Features:

- Turn-key FMR and ST-FMR spectrometer with easy to use software interface
- Built-in RF source, bias current source, bias-tee, detectors and lock-in
- Micro manipulator with ground-signal-ground probes
- Calculates the Effective magnetization ( $M_{eff}$ ), anisotropy ( $K$ ), gyromagnetic ratio ( $\gamma$ ), damping ( $\alpha$ ), inhomogeneous broadening ( $\Delta H_o$ )
- ST-FMR adds extraction of spin Hall angle (SHA), damping-like and field-like torque efficiency (DLTE and FLTE)

