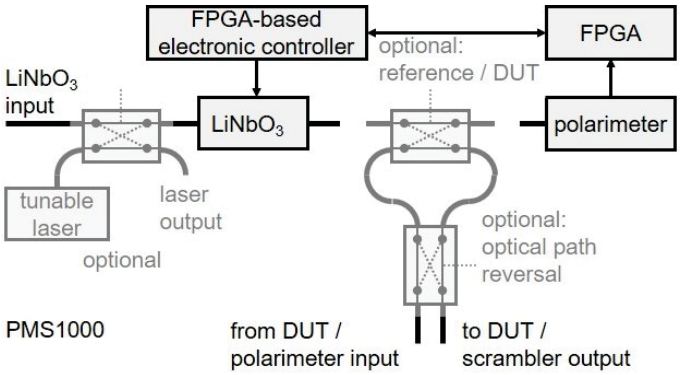
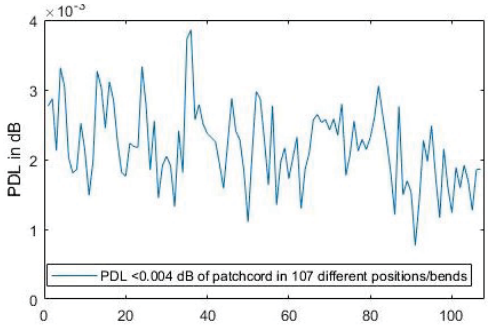
PMS1000 Polarimeter and Polarization Scrambler/Transformer

- Combination of the PM1000 polarimeter with the EPS1000 polarization scrambler/transformer
- All properties of PM1000 and EPS1000. Perfect for **PIC characterization in O-E-S-C-L-U bands**.
- Ideal for **synthesis of desired polarization states** and **device under test (DUT) polarimetry**
- Opto-mechanical or MEMS 2x2 switch can connect output of $LiNbO_3$ polarization transformer directly to input of polarimeter. Insertion loss of each path is thereby increased by ~0.5 dB (<1 dB).
- Another 2x2 switch can reverse propagation direction, to determine DUT reciprocity.
- **Tracking function** with feedback: optical (–2...< –50 dBm), electrical (custom or CTP10), polarimetric
- **Wide support of lasers** (LU1000 + all other manufacturers) and software (Matlab, Octave, Python)
- Desktop units (separate EPS1000 & PM1000 or combined PMS1000) or module cards

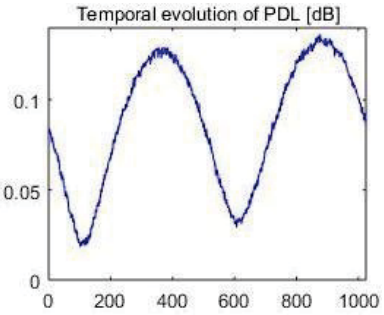


Mueller/Jones and PMD measurement. Optional components shaded. O/E/S/C/L band tunable lasers (such as LU1000).



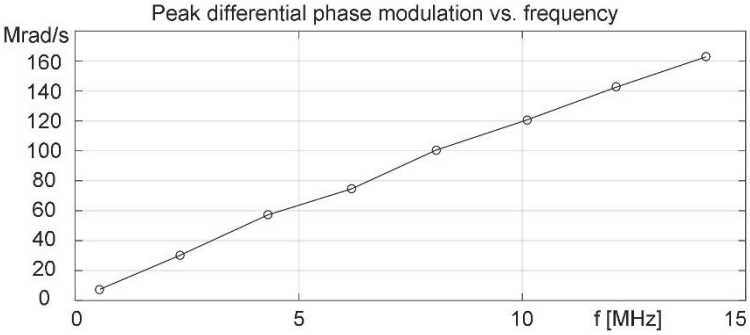
PDL measurement repeatability <0.004 dB

- ≥4 polarization states are generated for DUT and yield **Mueller matrix**, **Mueller-Jones matrix** (= Mueller matrix made non-depolarizing) and **Jones matrix**
- **Measurement time** can be **5.12 us** or even less.
- **Eigenmodes**, **retardation**, **mean loss**, **PDL** (**<0.005...>60 dB**) ⟶
- Decomposition of Mueller/Jones matrices into sequences SBA + PPPS + SBA. Definitions: PPPS = horizontal **p**artial **p**olarizer and **p**hase **s**hifter. SBA = **S**oleil-**B**abinet **a**nalog = retarder with retardation 0...π and eigenmodes on S_2-S_3 great circle. An SBA does to 0°/90° polarizations the same as a Soleil-Babinet compensator to circular polarizations: mode conversion with adjustable phase shift.
- **10 ns temporal resolution** of all time-variable component properties (Mueller matrix etc.) ⟶
- **PMD measurement <10 fs ... 10 ps with standard deviation ≤3 fs**
- With LU1000 or other tunable laser, Mueller/Jones matrices can be measured vs. optical frequency, and **PMD** is determined. Inverse scattering allows generating a **DGD profile** (= differential group delay profile; JLT **21**(2003)5, p. 1198, JLT **33**(2015)10, pp. 2127-2138, 2015).

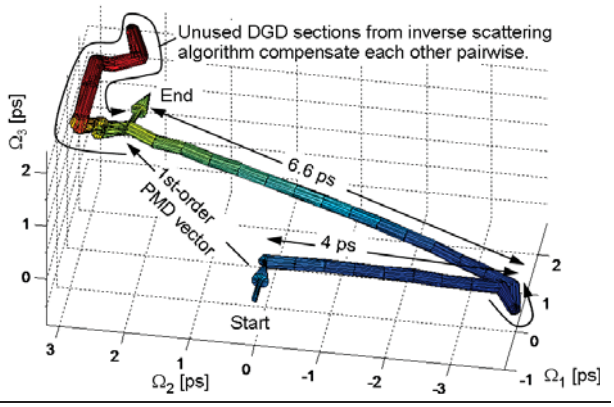


Time-resolved PDL of a rotating electrooptic halfwave plate (EPS1000) as a DUT, extracted from 1024 Mueller matrices recorded with **320 ns** temporal spacing.

Peak differential phase modulation vs. frequency



$LiNbO_3$ phase modulator is investigated as another DUT. From measured time-resolved Mueller matrices differential phase modulation is extracted.



Measured DGD profile in the PMD vector space of two concatenated, arbitrarily oriented PMFs, with DGDs of 4 and 6.6 ps. Not only the total 1st-order PMD vector but also the structure of the DUT becomes apparent.