PITZ – IAP RAS Meeting

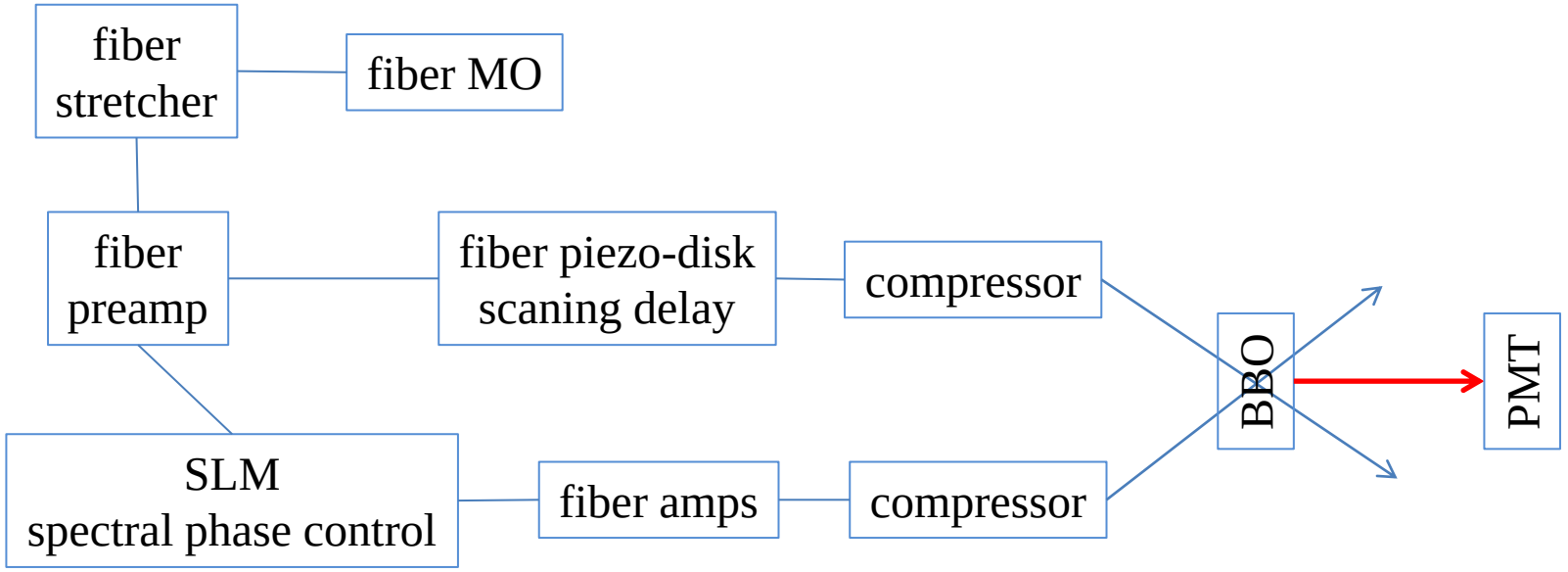
March 2-3, 2020
DESY PITZ, Zeuthen, Germany

Sergey Mironov, Mikhail Martyanov
(IAP RAS, Nizhny Novgorod, Russia)

Cross-correlator signal

We are using home-built 2-channel fiber laser:
-Diagnostic channel: 47.5 MHz, 260 fs, 12 mW
-Main channel: 47.5 MHz / 64, ~400 fs, 5 mW intraburst

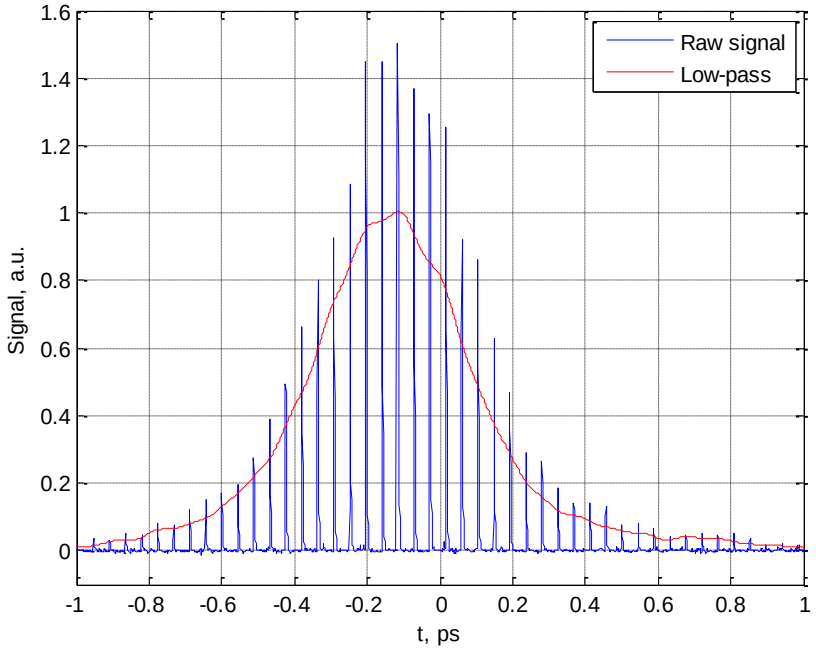
Both signals are crossed in non-critical plane of 4mm type-I BBO crystal

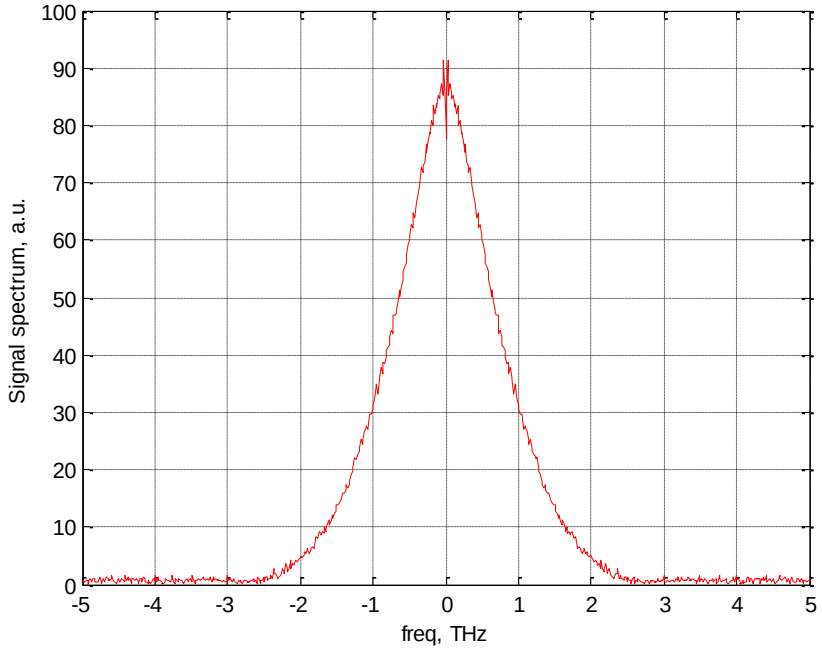


Full compression

x = -1 … 1
Phase = Fi2*x^2 + Fi3*x^3 + Modulation
Modulation = 0
Fi2 = +100 / 210
Fi3 = -2000 / 210

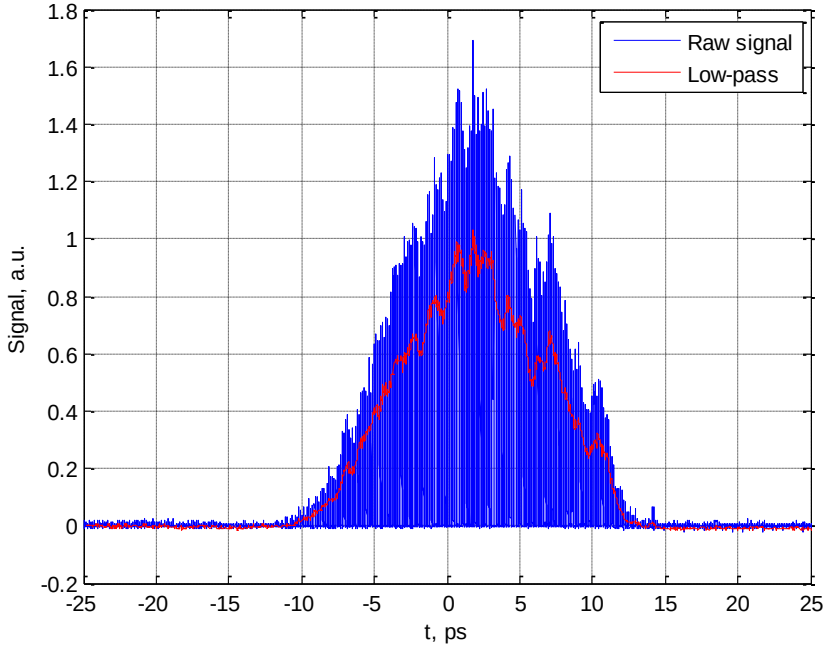
Cross-correlation FWHM ~ 480fs
pulse width FWHM = sqrt(480^2-260^2)=400fs

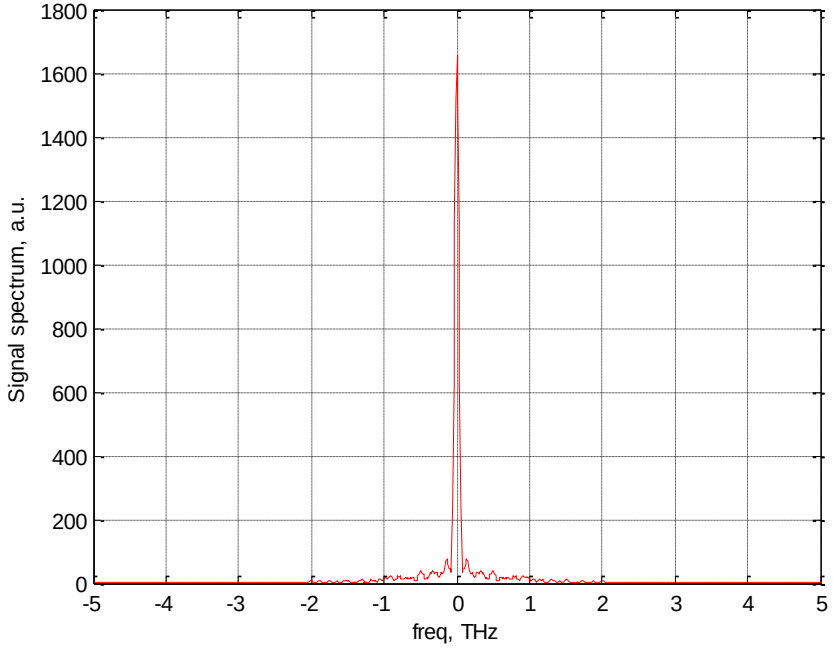




Modulation OFF

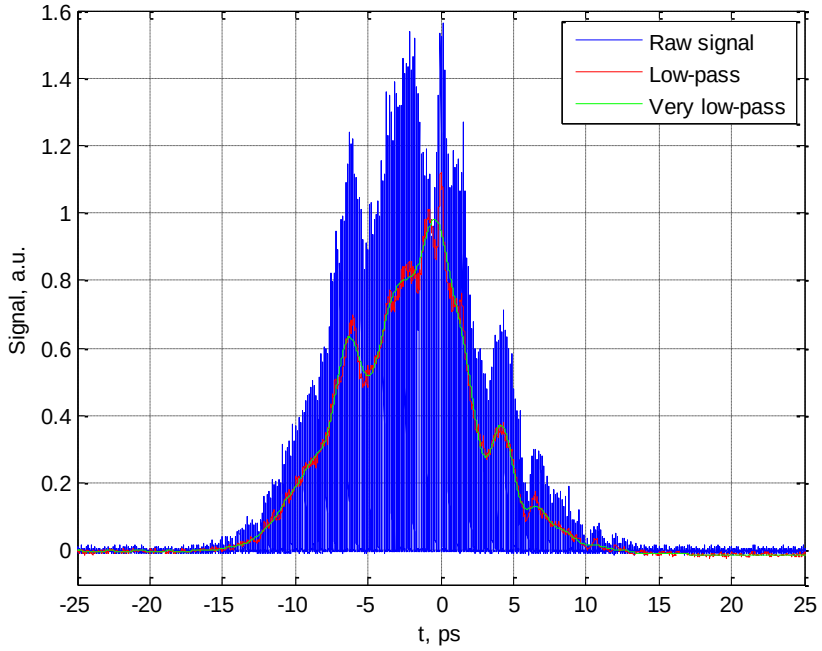
x = -1 … 1
Phase = Fi2*x^2 + Fi3*x^3 + Modulation
Modulation = 0
Fi2 = (+100+5300) / 210
Fi3 = -2000 / 210

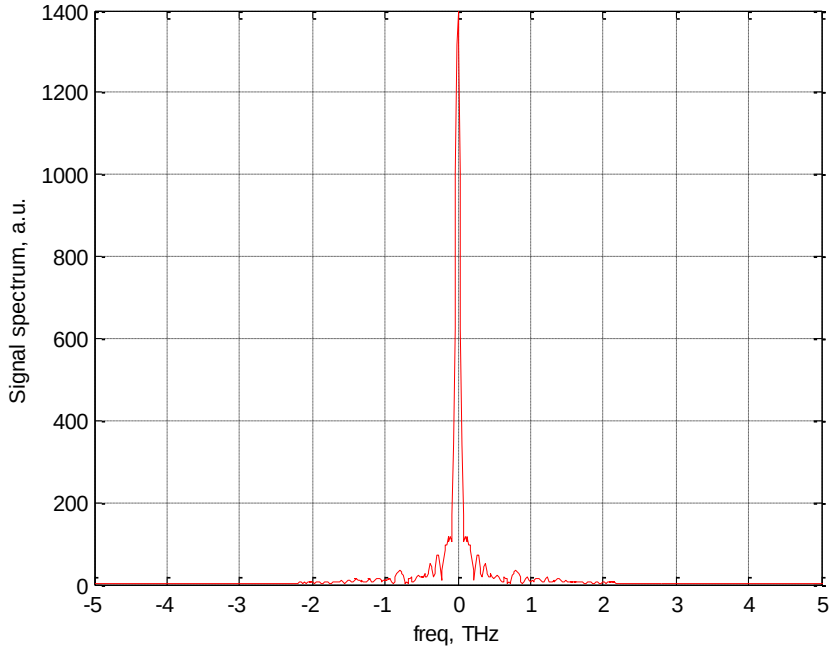




Modulation OFF, chirp of the opposite sign

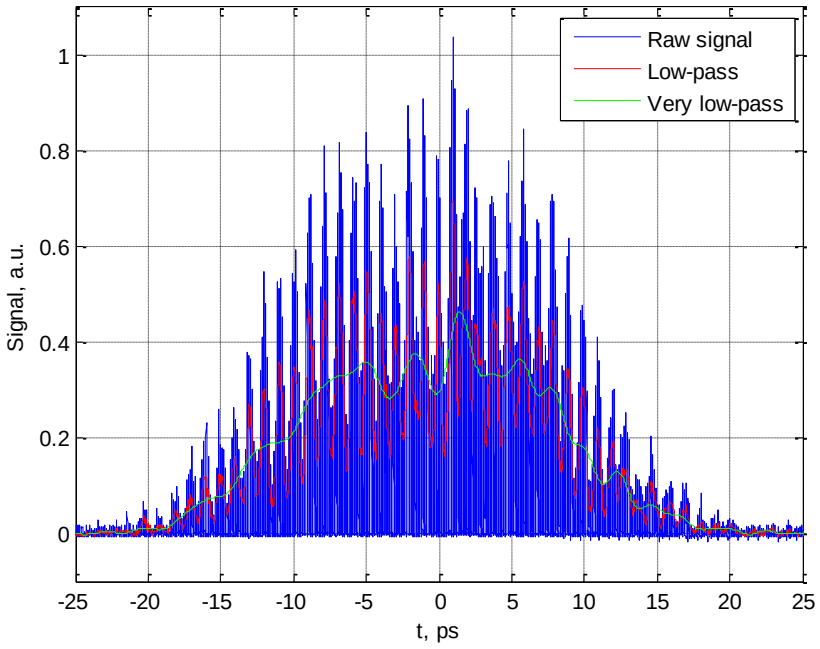
x = -1 … 1
Phase = Fi2*x^2 + Fi3*x^3 + Modulation
Modulation = 0
Fi2 = (+100-5300) / 210
Fi3 = -2000 / 210

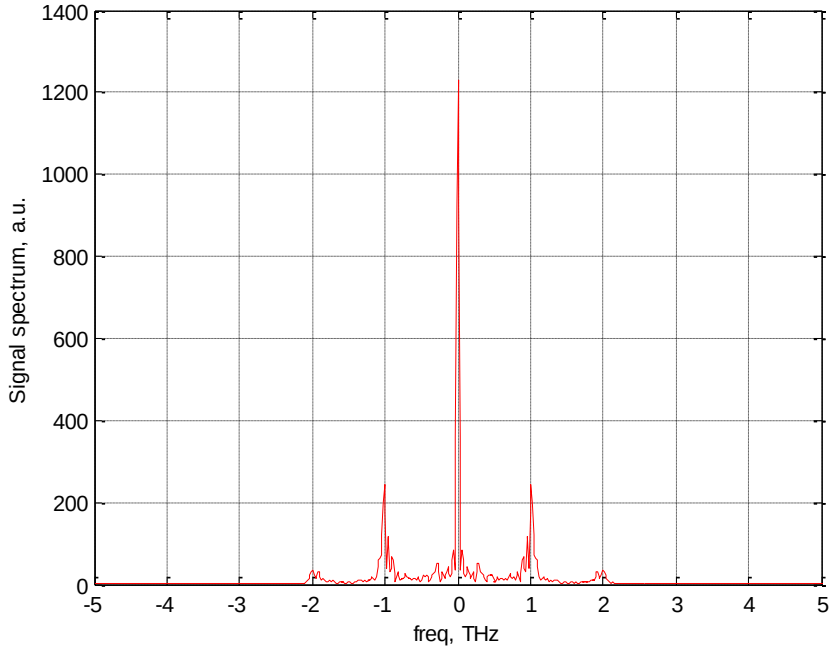




1 THz modulation

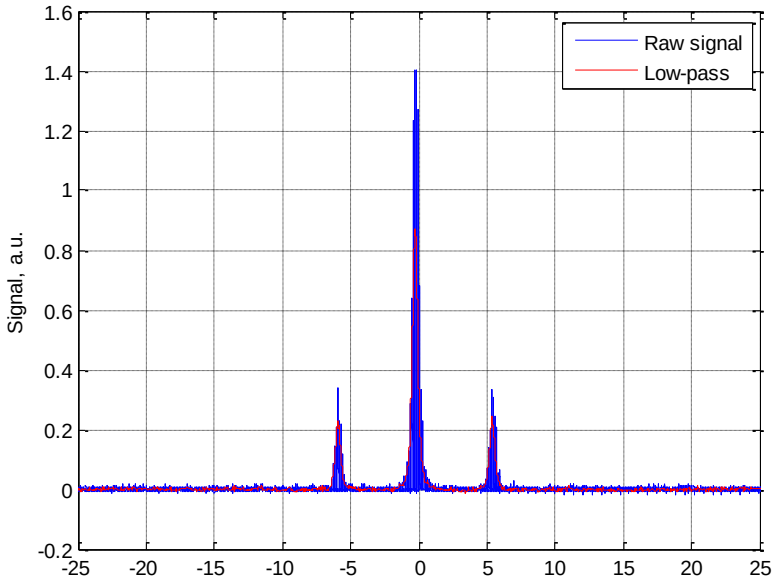
x = -1 … 1
Phase = Fi2*x^2 + Fi3*x^3 + Modulation
Modulation = pi*sin(pi*x*38) / 2
Fi2 = (+100-5300) / 210
Fi3 = -2000 / 210



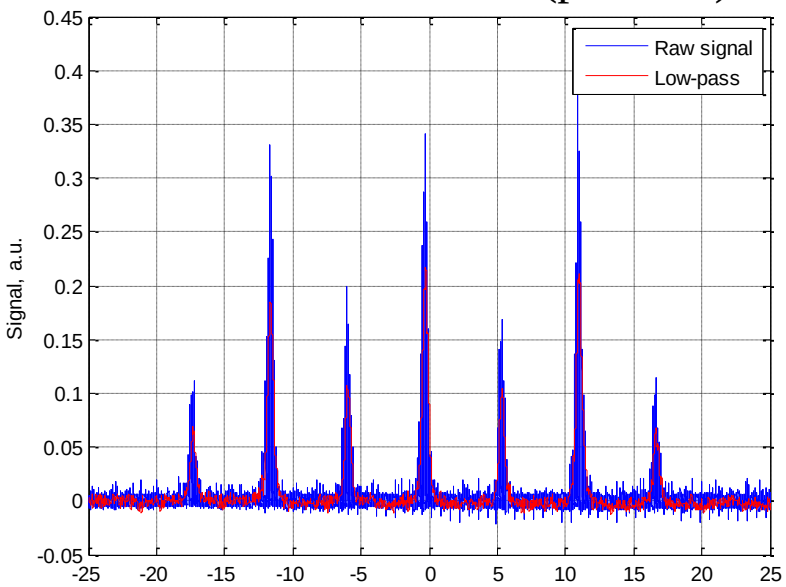


Spectral phase modulation with full compression

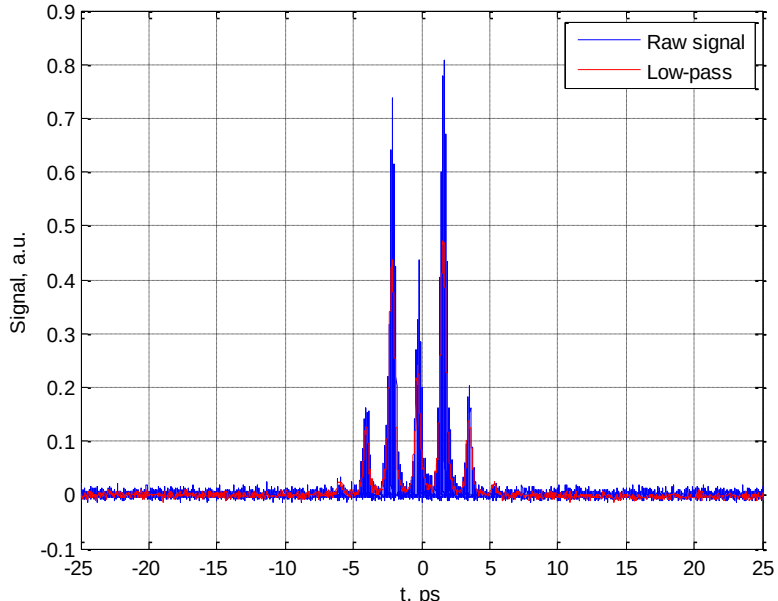
Modulation = 105*cos(pi*x*30)/4;



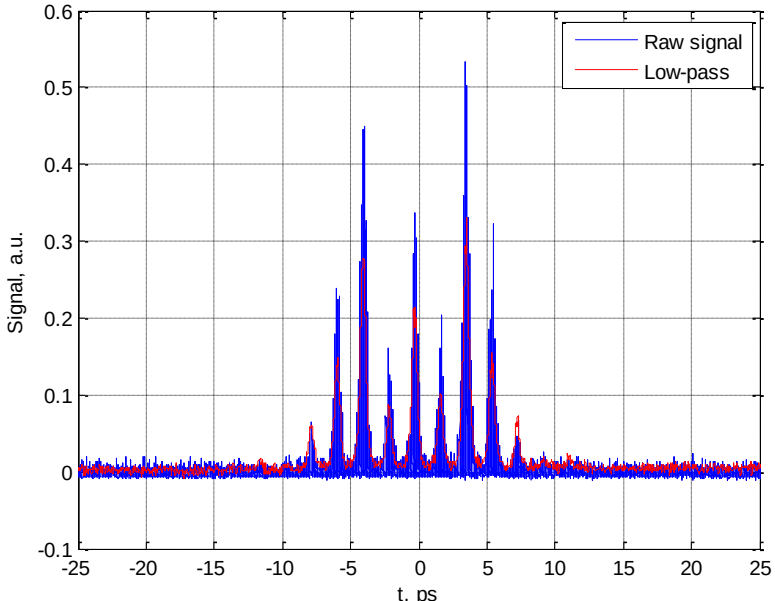
Modulation=105*cos(pi*x*30);



Modulation=105*cos(pi*x*10)/2;



Modulation=105*cos(pi*x*10);



Using single SLM as both spectral phase and amplitude modulator simultaneously !

There is a new idea (**maybe known?)** to use a single SLM as both phase and amplitude spectral modulator. We are going to publish it.

Here it is and example of optical spectra modulated by means of SLM in the pure phase mode.