# Process Related Signal Processing
## Application to Optimal Particle Measurements

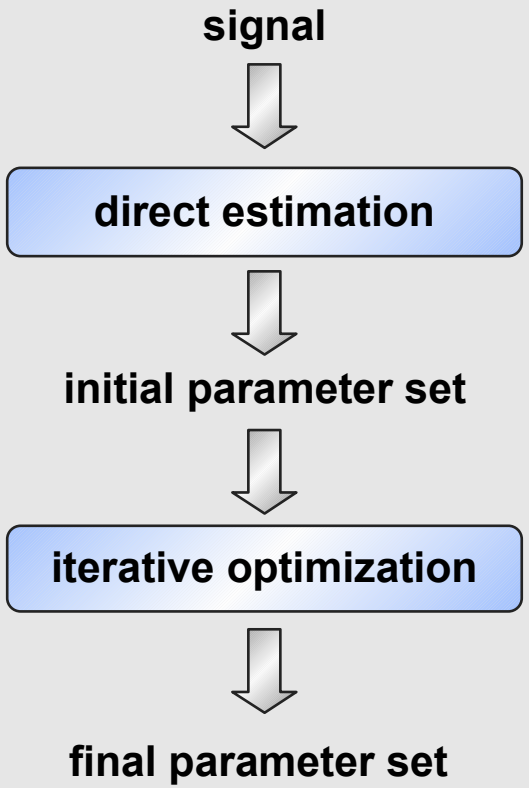
- Improvement of LDA and PDA signal processing (accuracy, range, additional parameters, e.g. time shift)
- Application to accelerated or oscillating particles (flexible signal models)
- Multi burst LDA signals (overcome the processor delay)
- Dual burst PDA, Backscatter PDA

# 1st year

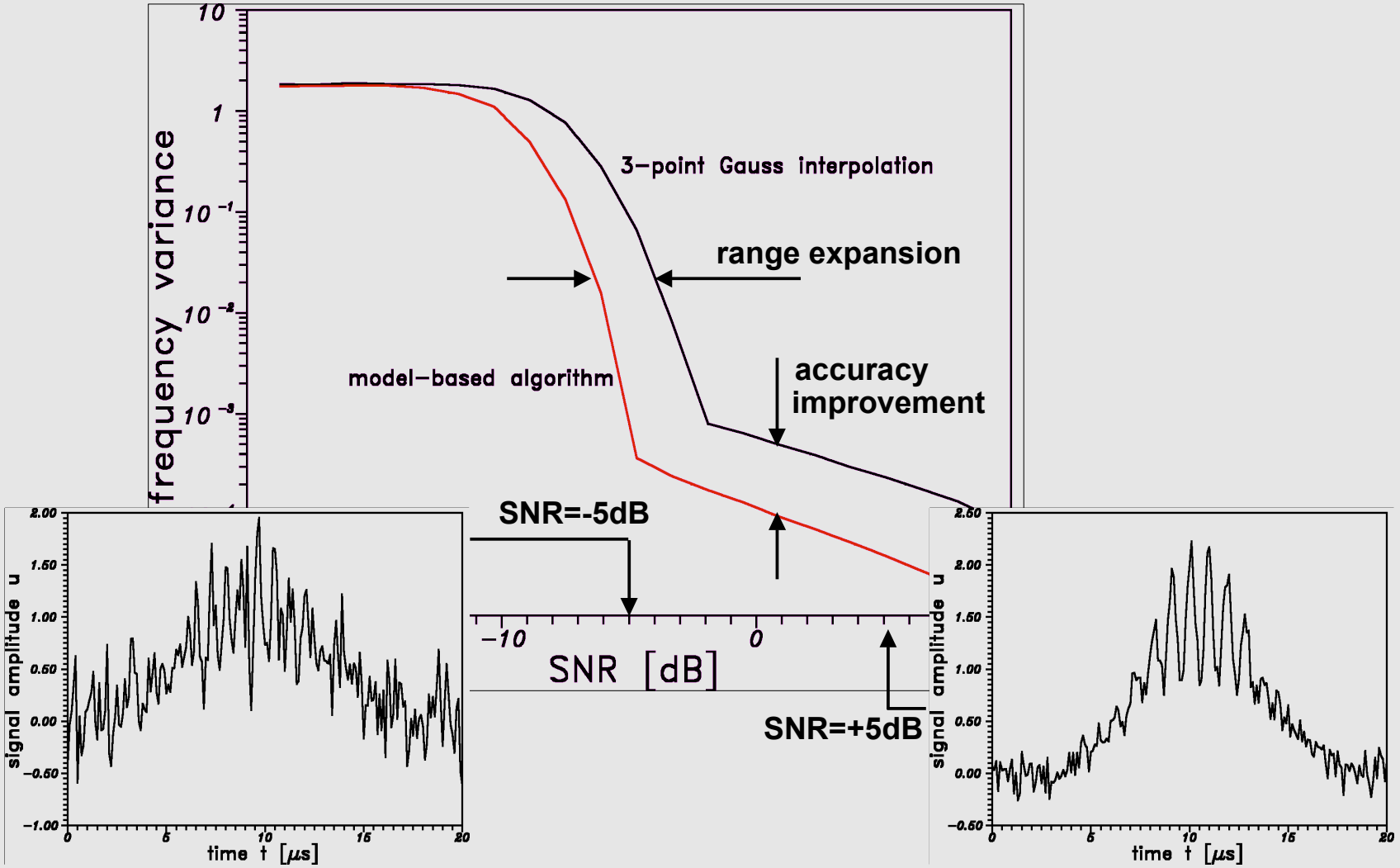
- model based signal processing from statistical functions (auto/cross spectrum/correlation function/convolution)
- application to LDA, PDA, dual burst LDA, dual burst PDA
- development of algorithms for iterative optimization (e.g. tangent algorithm)

# Model Based Estimation

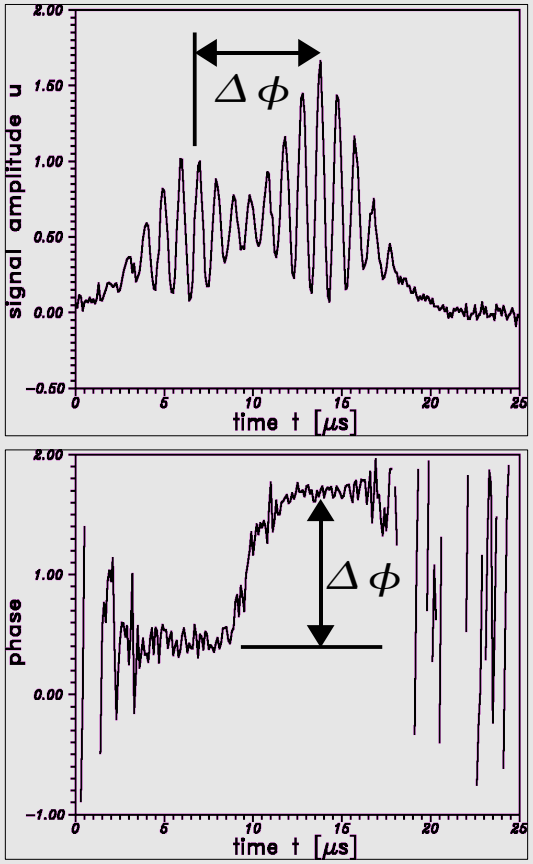
- high accuracy
- high computational costs
- direct estimation limits the rage
  - ➔ stable pre-estimation

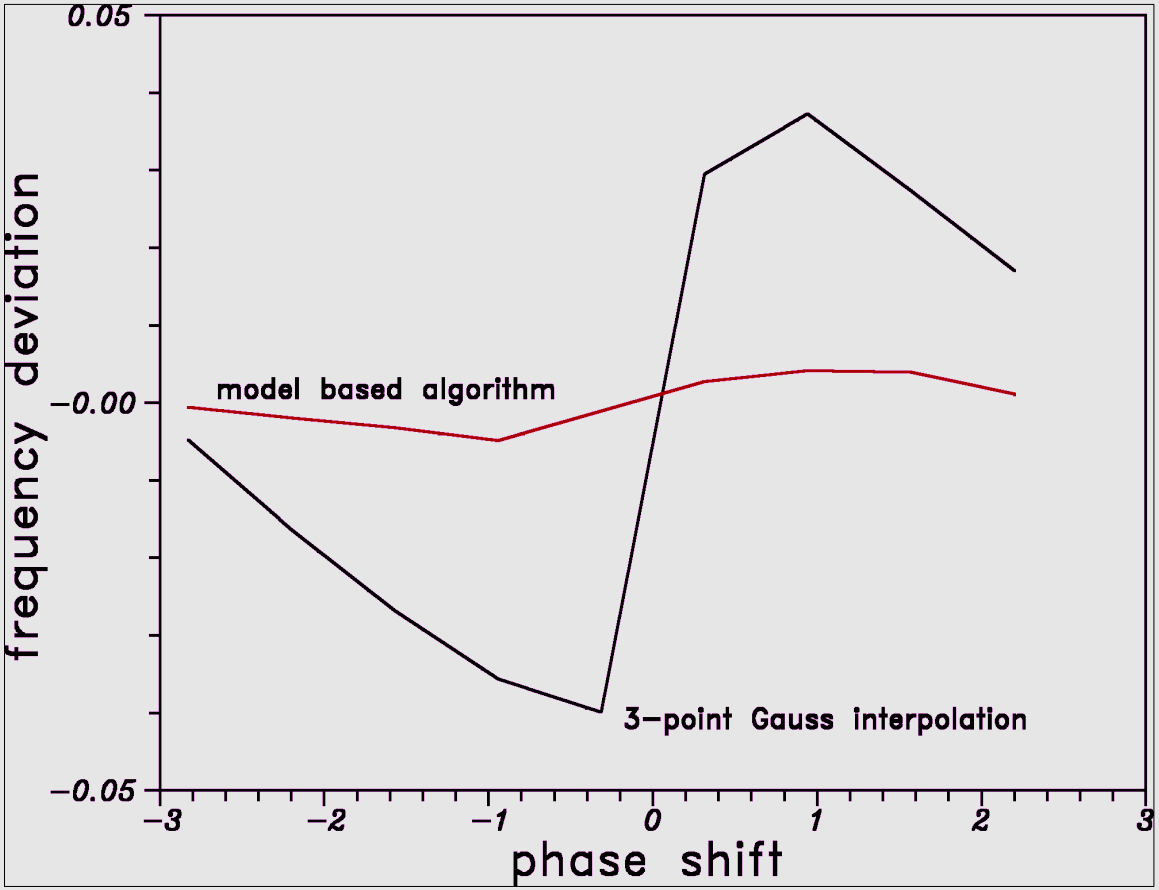


# Results LDA/PDA



# Multi Burst Signals



# 2nd year

## Direct estimation

(from the Fourier transform)

- LDA, PDA*
- acc. LDA, PDA*
- dual burst LDA, PDA
- dual burst LDA, PDA (with burst separation)

- easy to implement
- fast
- high variance

## Wavelet algorithm

(signal pattern filters, optimized temporal filters)

- LDA, PDA*
- acc. LDA, PDA*
- dual burst LDA, PDA

- reaches almost the CRLB
- acceptable computational costs

## Model based optimization

(in time domain)

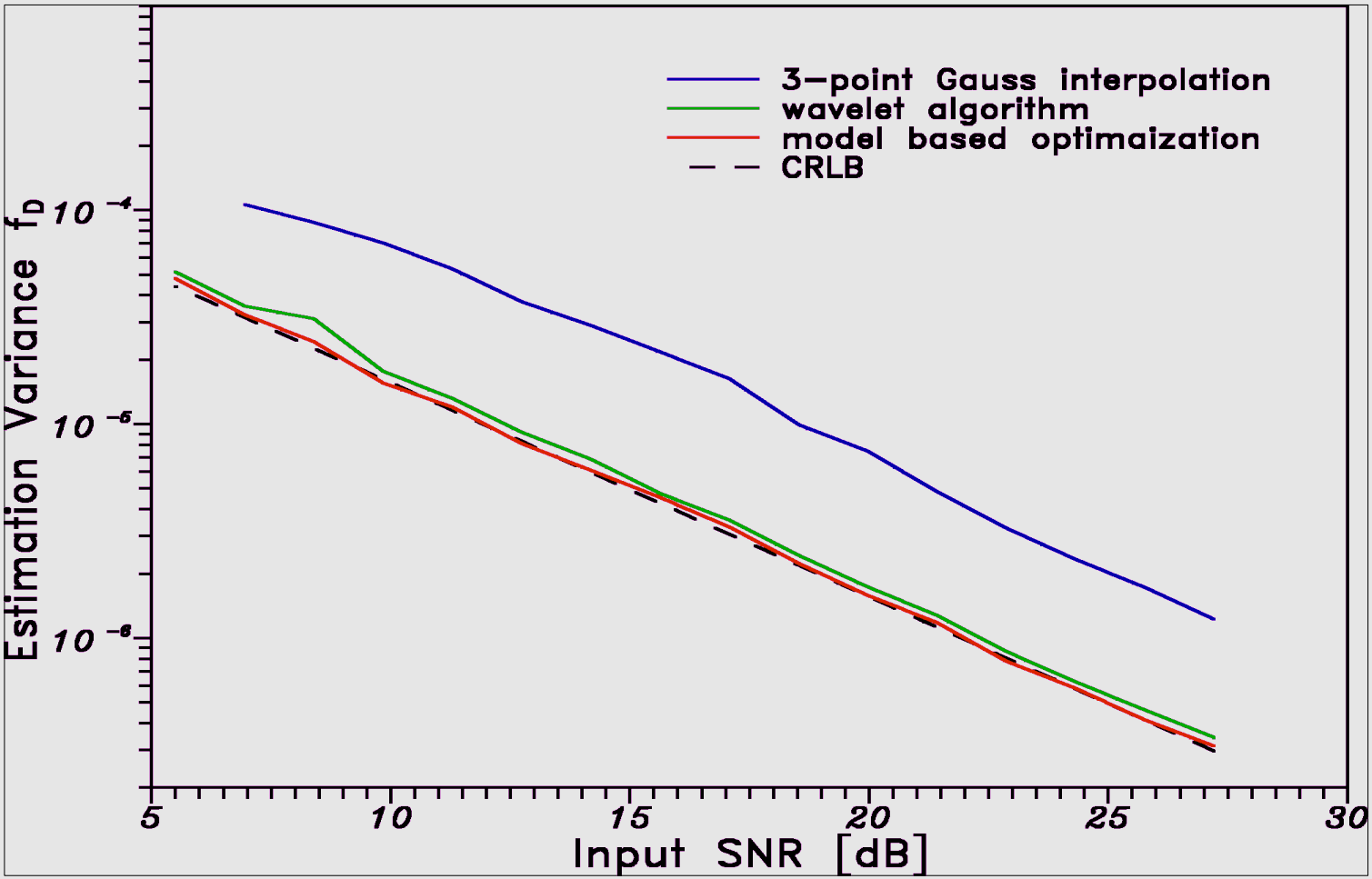
- LDA, PDA*
- acc. LDA, PDA* (with distortions of the interference field)
- dual burst LDA, PDA

- high computational costs
- reaches the CRLB
- very flexible

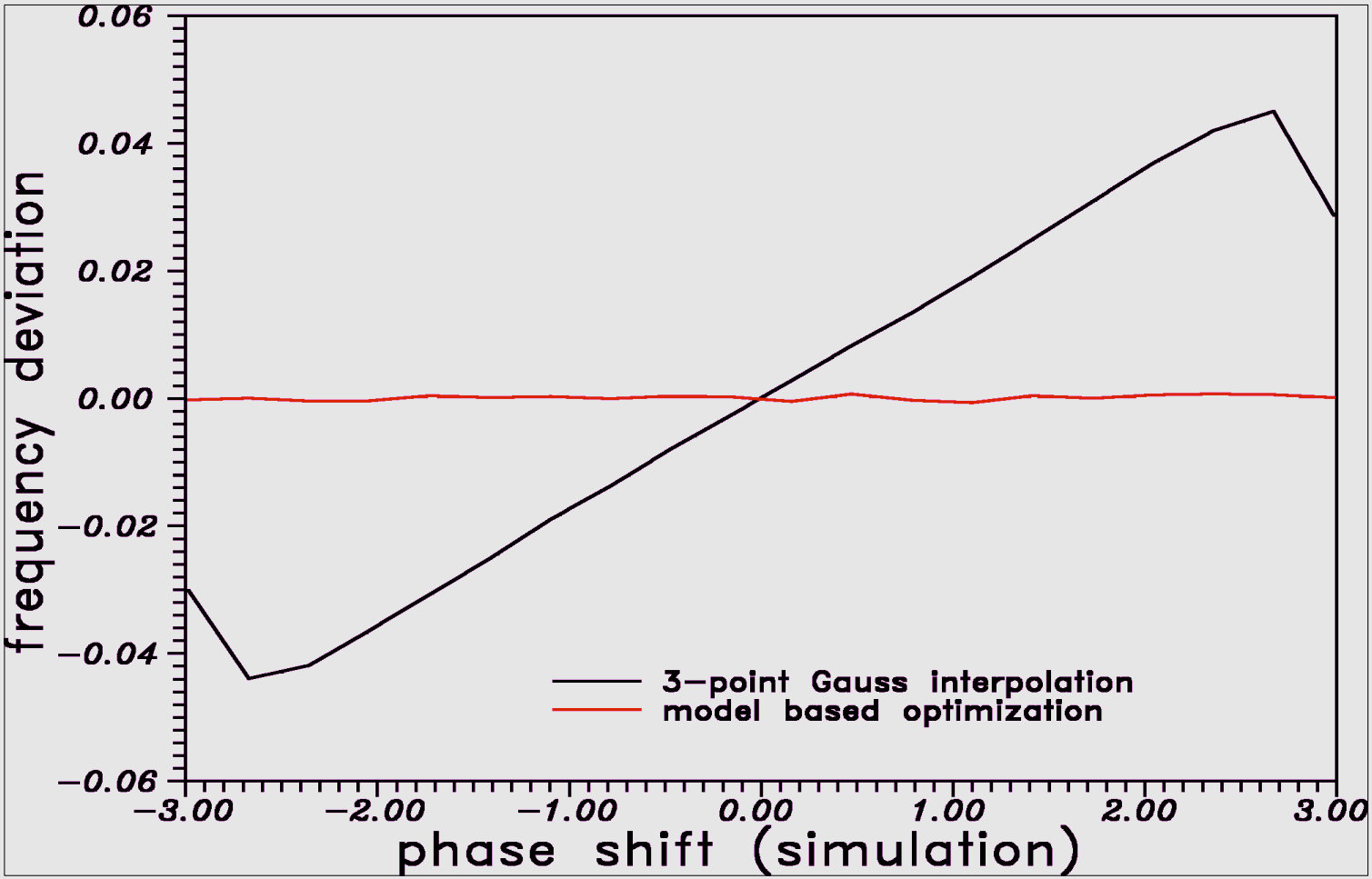
*PDA always with temporal burst displacement

solved and documented  solved, not documented  unsolved

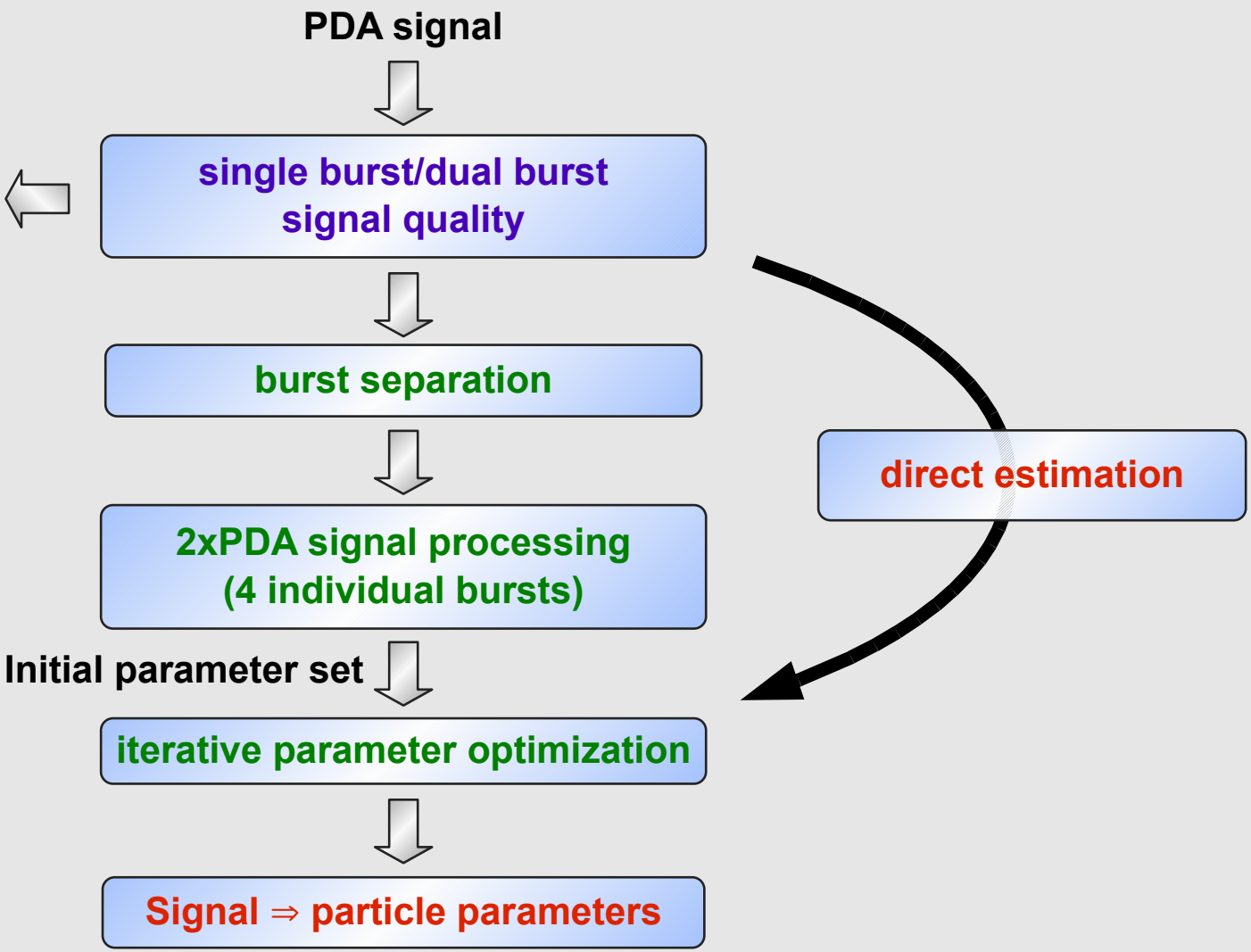
# Results LDA/PDA



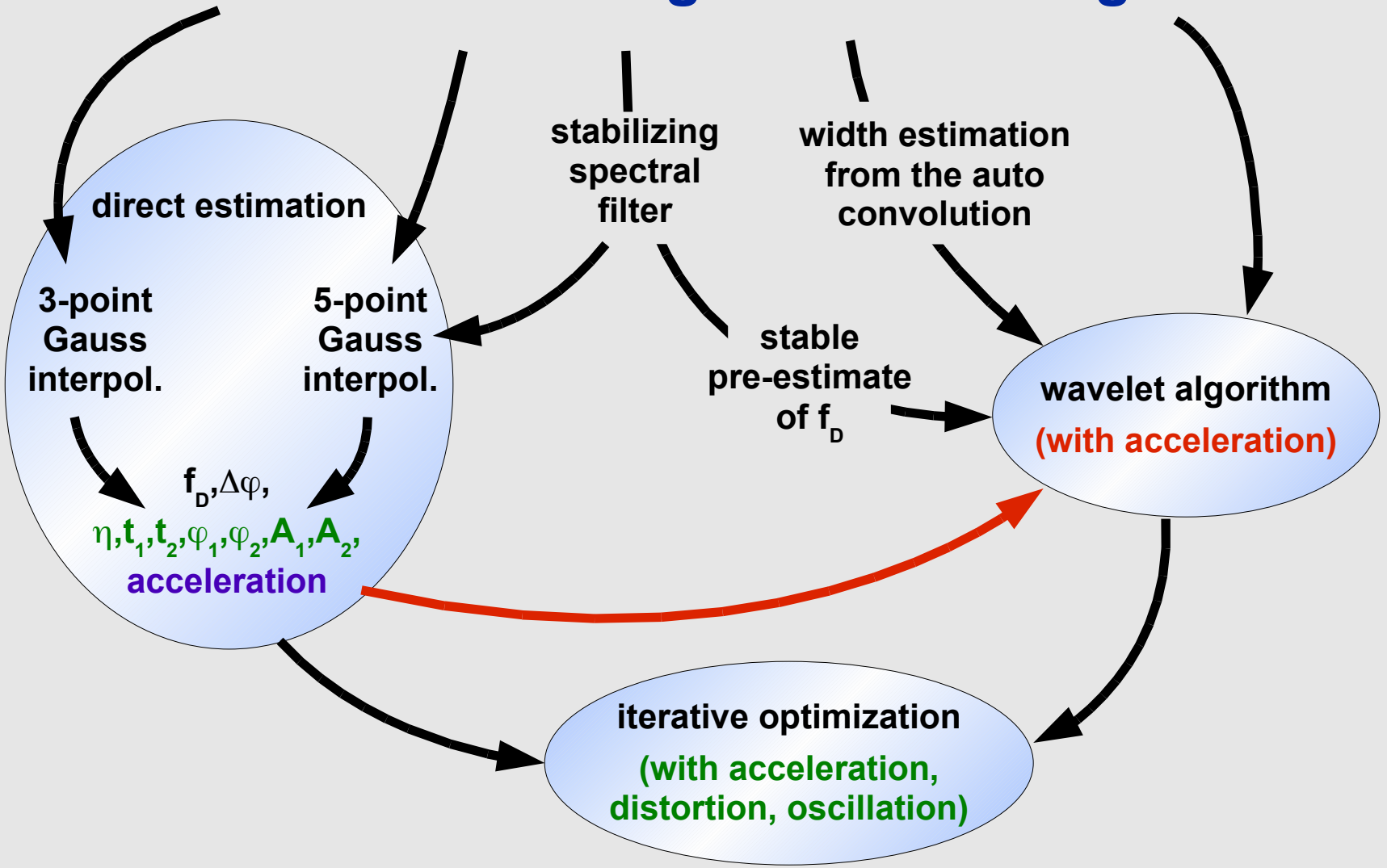
# Multi Burst Signals



# Backscatter PDA



# LDA/PDA Signal Processing



# Other Developments/Investigations

- Second Order Correlation PIV
- LDA data filtering
- LDA data processing
- LDA data generator for benchmark tests

# Future Work

- Backscatter PDA
- PIPS
- LDA/PDA signal processing
- algorithms
- test measurements
- implementation