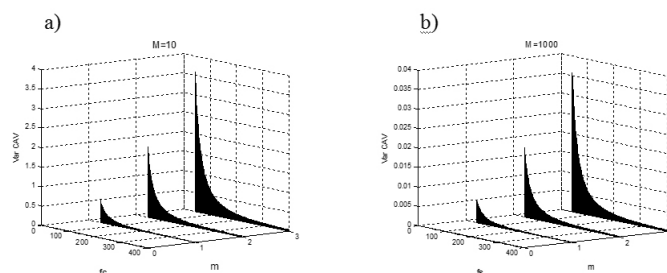


## 25TS010 Assessment of the uncertainty associated with synchronization error in analog to digital conversion with dither and CAV

Anna Domanska<sup>174</sup>

This article applies to assess the impact of imperfect synchronization on signal value as a result of the digital coherent averaging used after a-d conversion with dither signal. A variance value of signal samples due to a synchronization error was determined. By a non-zero synchronization error, coherent averaging reducing additive noise causes distortions of values of the signal who results from averaging and increasing the value of the conversion a-d result's uncertainty.

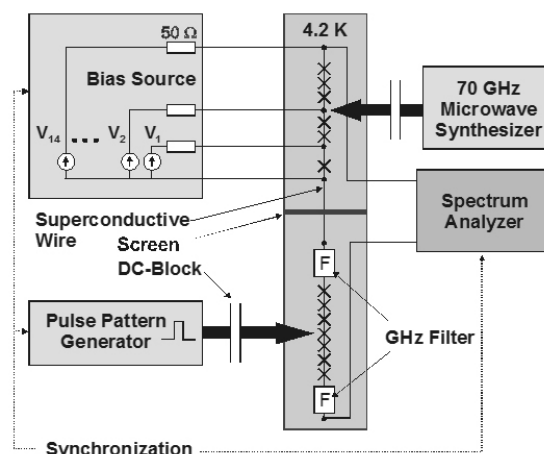


**Variance of CAV result for different numbers of averaged repetition:**  
a)  $M = 10$ , b)  $M = 1000$

## 25TS050 Ultrapure sinewave generation by combining Josephson systems

Ralf Behr<sup>175</sup>, Oliver Kieler<sup>175</sup>, Detlef Schleußner<sup>175</sup>, **Luis Palafox**<sup>175</sup>, Franz Ahlers<sup>175</sup>

The combination of systems exploiting binary-divided and pulse-driven Josephson arrays allows the generation of sinewaves with amplitudes of up to 10 V and very low harmonic distortion ( $-122$  dBc). We present results from the combination of a 1 V binary divided Josephson array employed as a multilevel digital to analogue converter and a pulse driven array that is programmed to cancel the harmonic content present in the stepwise approximated output of the binary array. The synthesized waveform can be locked to a timing reference for ultimate frequency stability. The quantum nature of the Josephson synthesizers guarantees the stability of the amplitude. The unprecedented amplitudes available with this spectral purity open new possibilities for testing of electronic modules and analogue to digital converters.



**Schematic diagram for the combination of the PJVS and the JAWS.**