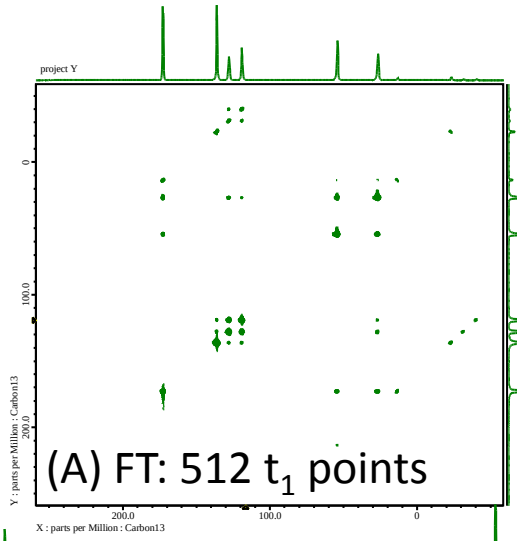
Homonuclear covariance transformation in solid-state NMR!

Covariance (Cov) transformation helps us to reduce the data collection time in homonuclear correlation solid-state NMR experiments such as NOESY and INADEQUATE. In these experiments, large number of t_1 points are usually required to achieve sufficient spectral resolution in the indirect dimension. For example, fully collected Fourier transformed (FT) spectrum of L-histidine monochloride was obtained with 512 t_1 points (A). When the number of t_1 points was reduced to 40 (B), significant wiggle was observed, resulting in very low resolution. Cov spectra (C) of 40 t_1 points (C) produces a spectrum almost identical to (A). Cov achieves more than 10 times reduction of experimental time!

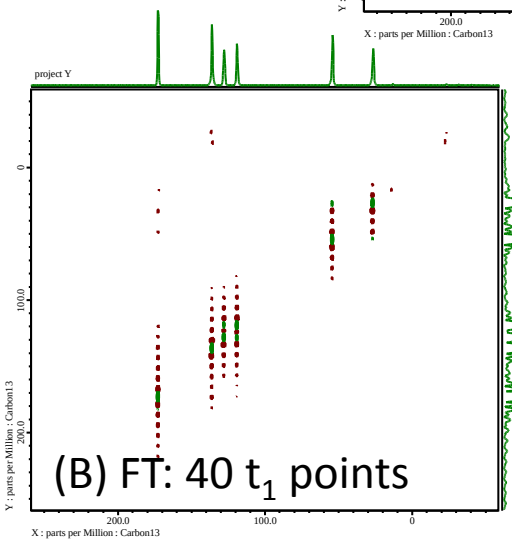
^{13}C-^{13}C PDSD correlation spectra

ECA500
3.2mm HXMAS
20 kHz MAS
$^{13}C_6$,$^{15}N_3$ L-histidine HCl



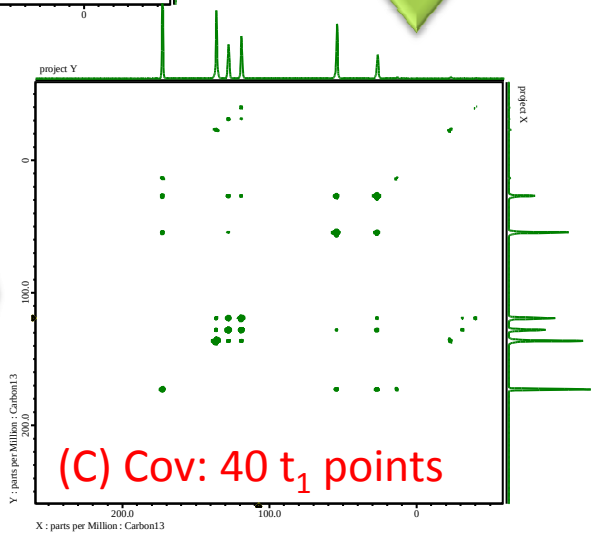
(A) FT: 512 t_1 points

1/10 time without losing anything!



(B) FT: 40 t_1 points

Covariance!



(C) Cov: 40 t_1 points

J. Magn. Reson. 171 (2004) 277-283.

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