Compressed Sensing – basic idea

- A signal, which is sparse in some representation, can be undersampled (skip measurements) and then reconstructed mathematically
- Full sampling: $Fx = y$ (full system),

  F – inverse Fourier transform, x – spectrum, y – FID

  Undersampling: $\tilde{F}x = \tilde{y}$ (undetermined system)

  CS reconstruction: $\min_x \|x\|_p$ subject to $\tilde{F}x = \tilde{y}$

  (out of all possible FIDs choose the one which gives the sparsest spectrum)

  Taking noise into account: $\min_x \left(\left\| \tilde{F}x - \tilde{y} \right\|_2 + \lambda \|x\|_p \right)$