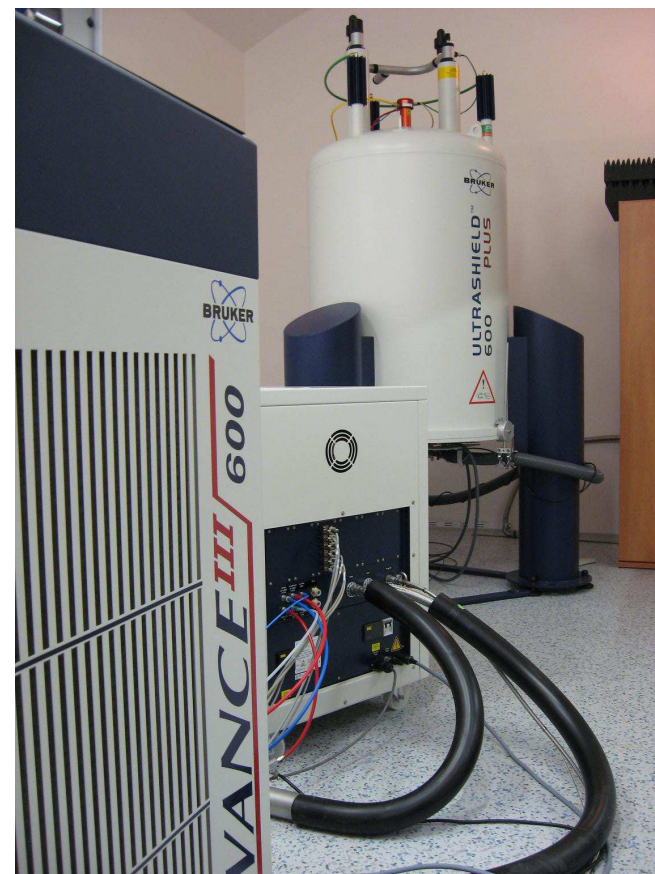


NMR spektrometr

hardware a experimentální parametry

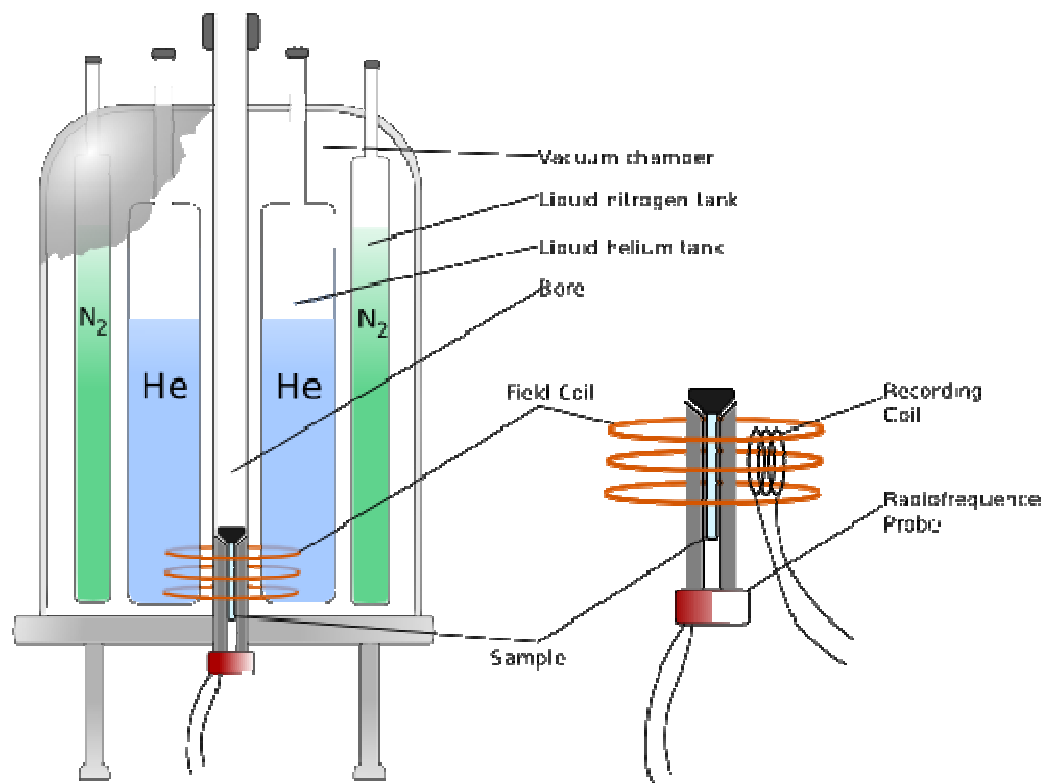
Naše NMR spektrometry

Varian NMR System 300 MHz
Varian INOVA 400 MHz

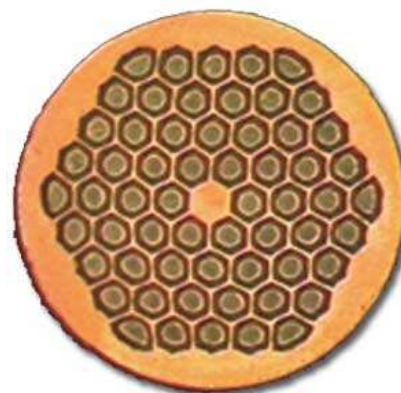


Bruker Avance III 600 MHz
Bruker Avance III HD 400 MHz

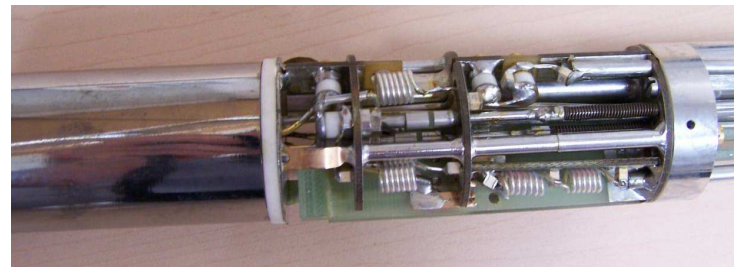
NMR spektrometr – magnet



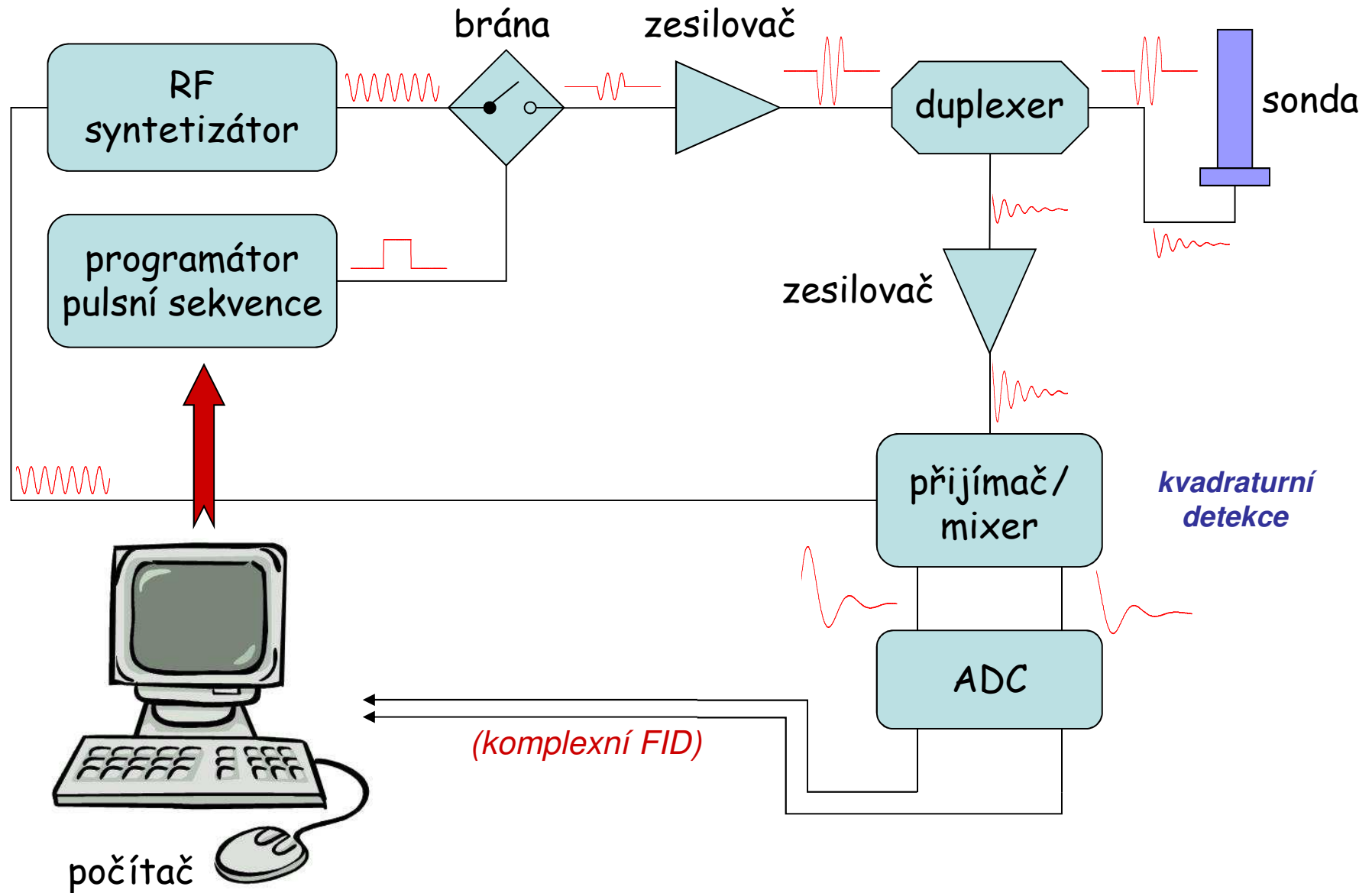
průřez supravodičem



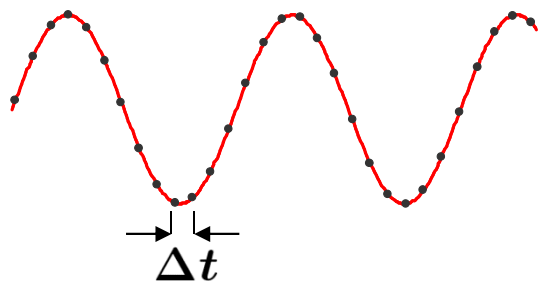
NMR spektrometr – sonda



NMR spektrometr – schema



Digitální detekce



Nyquistovo kritérium

$$\Delta t = \frac{1}{\text{SW}} \quad \text{spektrální šířka}$$

Počet bodů

$$N_p$$

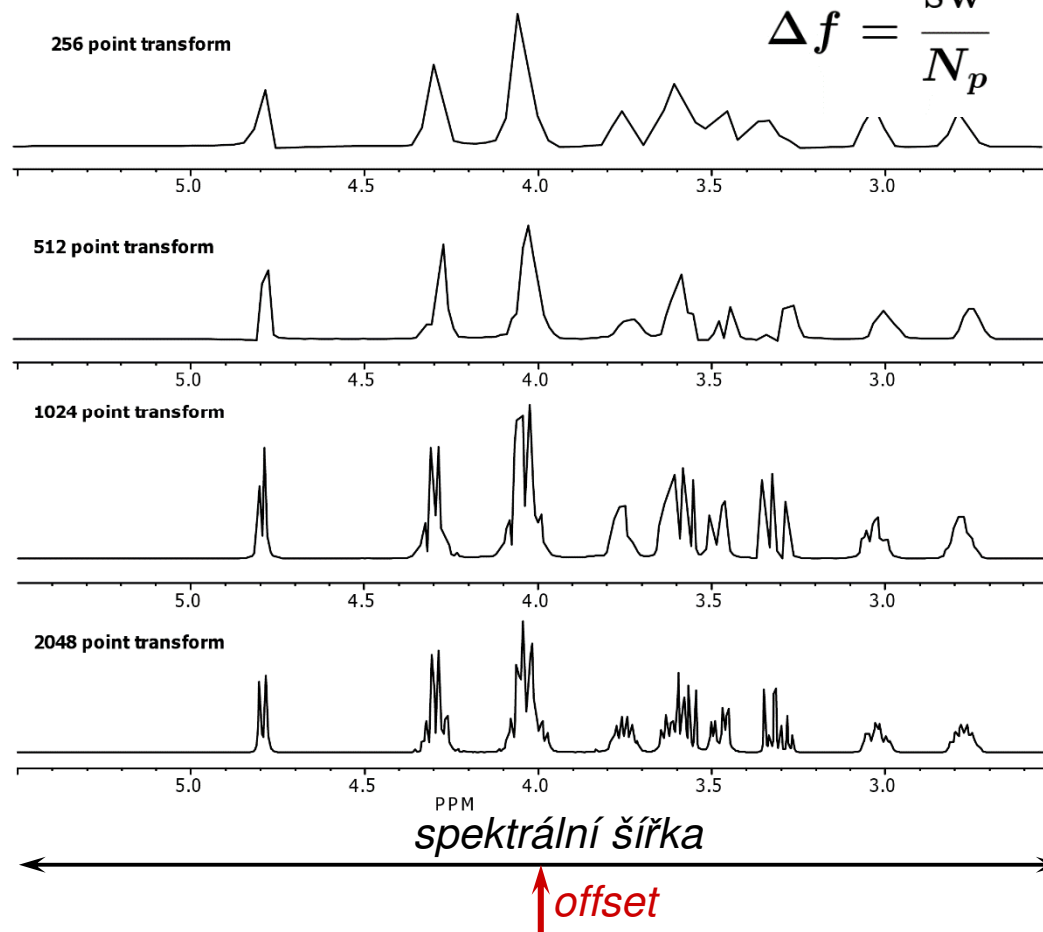
Akviziční doba

$$t_{acq} = N_p \Delta t$$

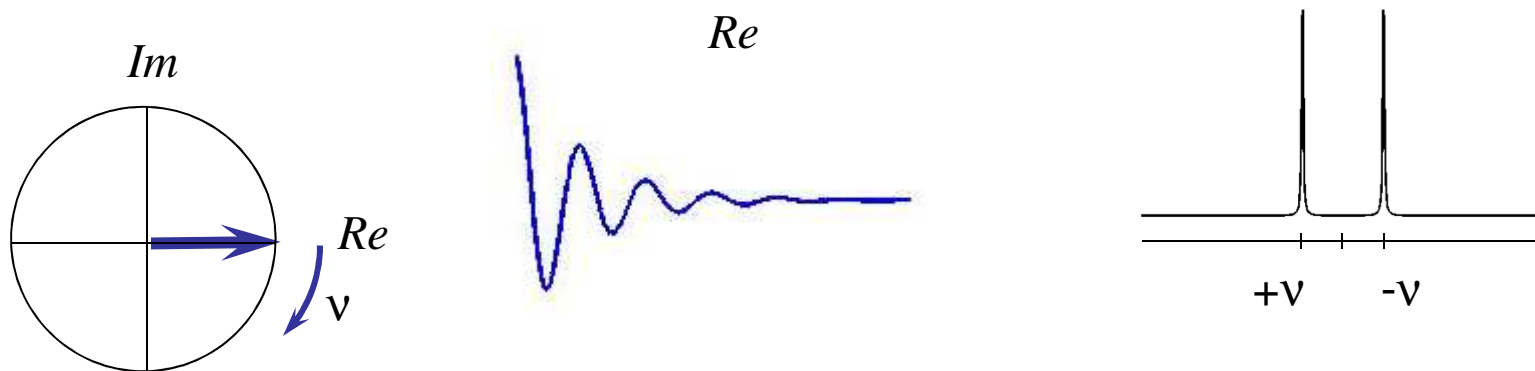


Spektrální rozlišení

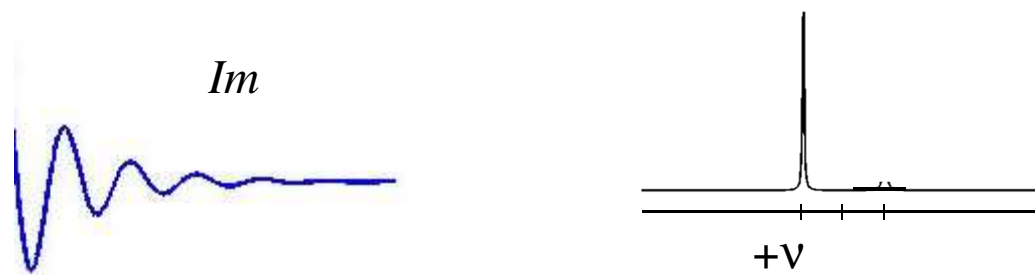
$$\Delta f = \frac{\text{SW}}{N_p}$$



Kvadrurní detekce



pohled ve směru jedné osy nerozliší smysl precese

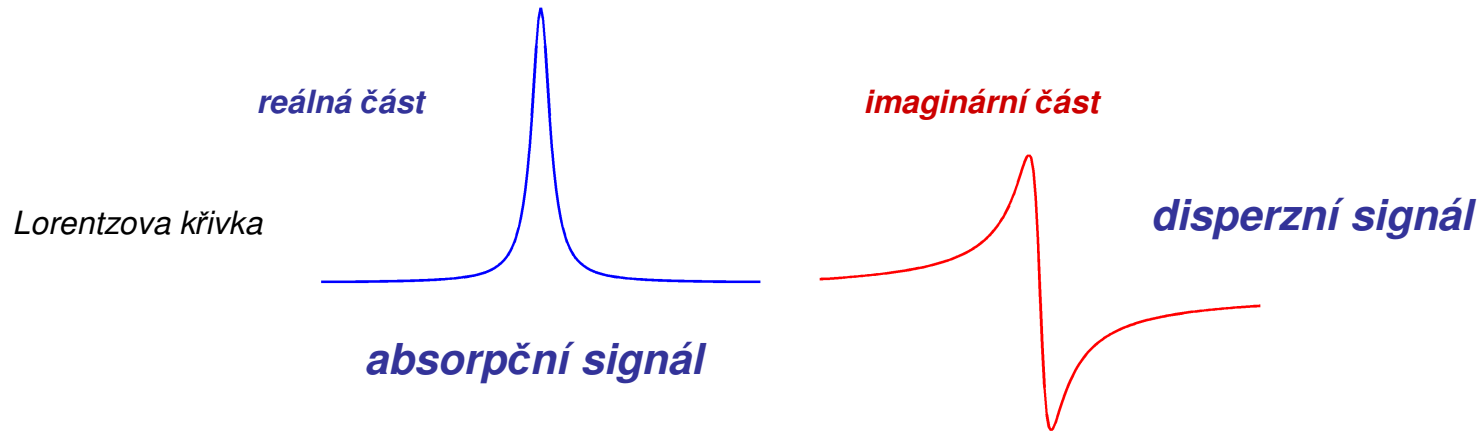


FID – komplexní signál



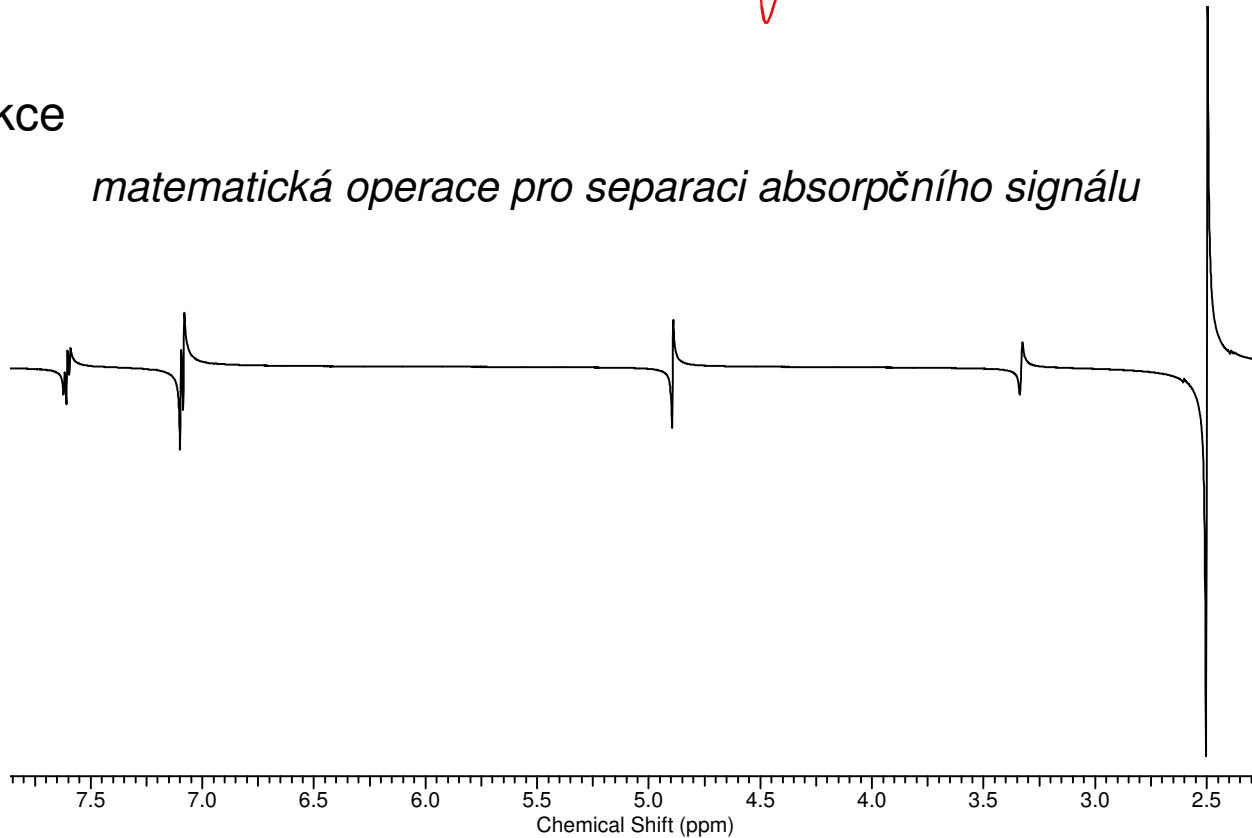
komplexní spektrum

Tvar spektra

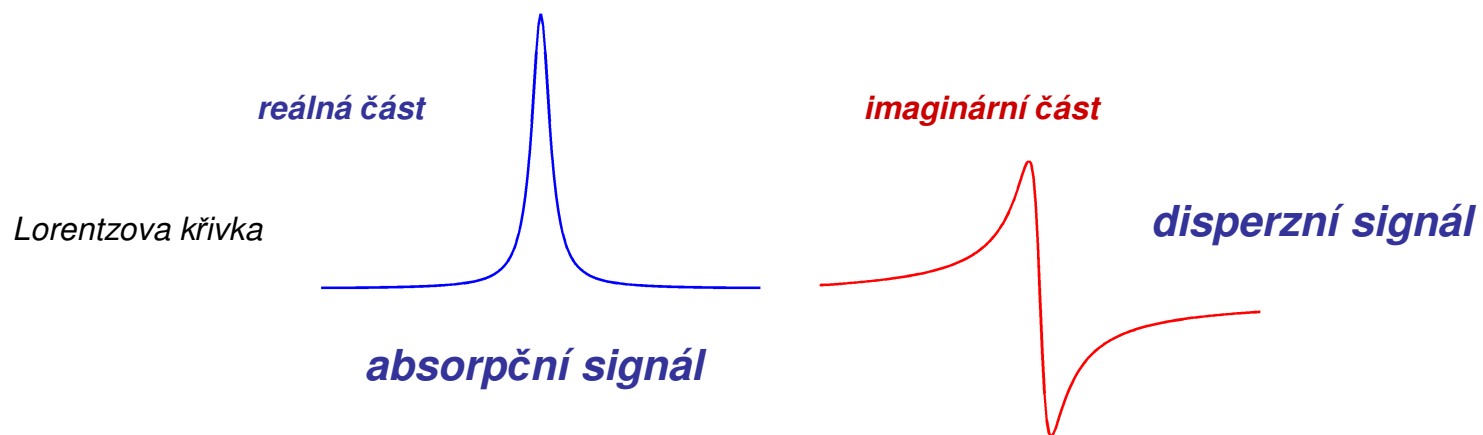


Fázová korekce

matematická operace pro separaci absorpčního signálu

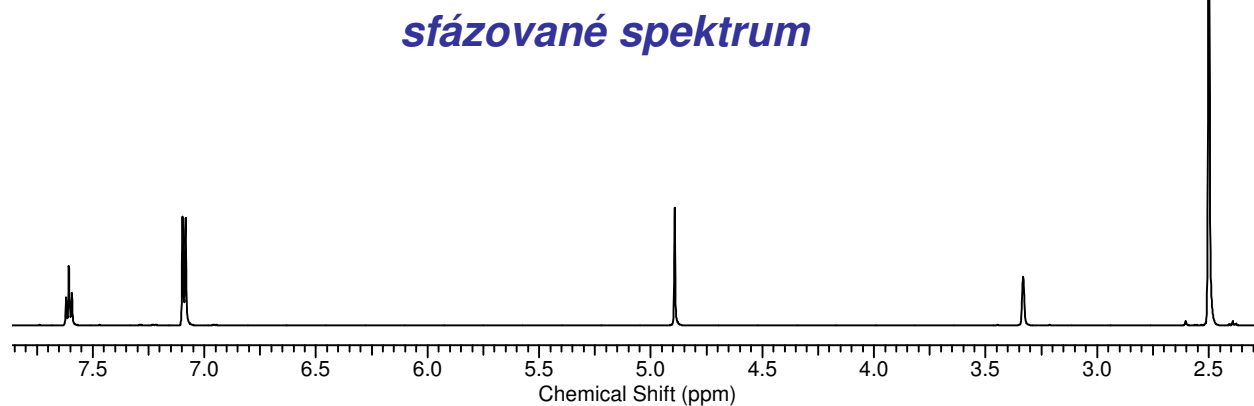


Tvar spektra

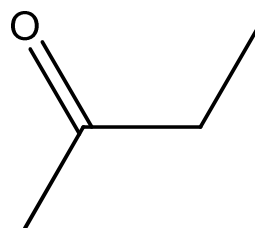
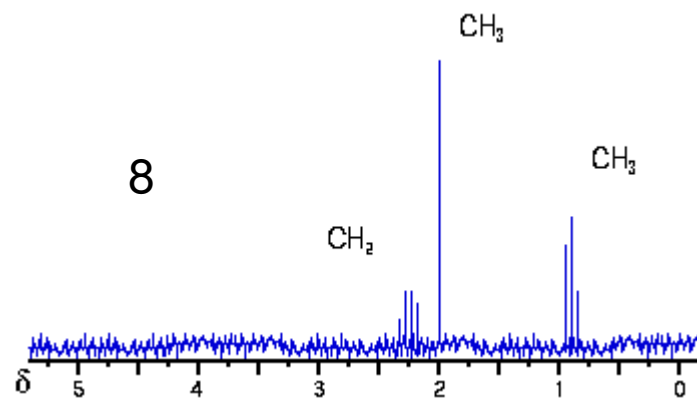
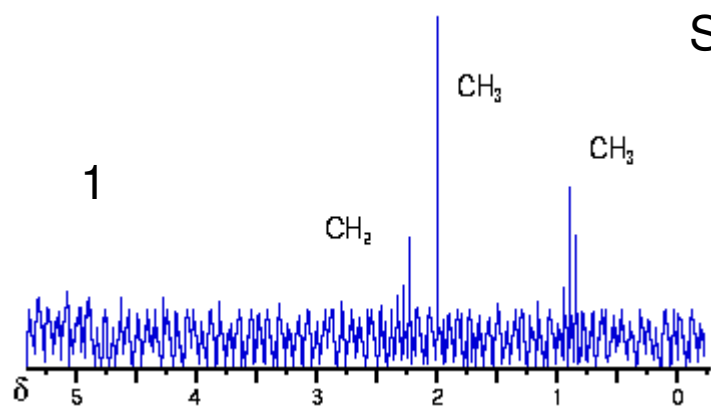


Fázová korekce

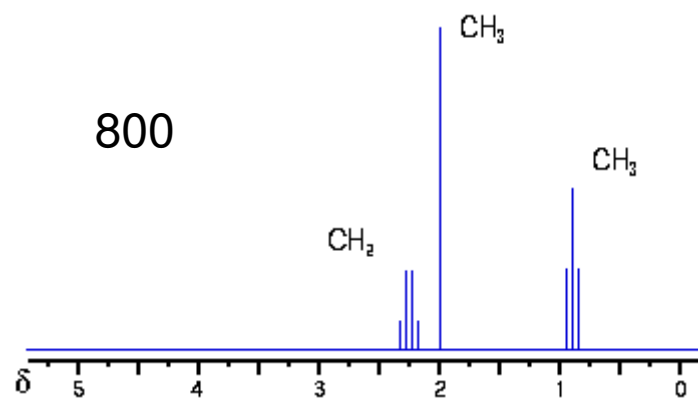
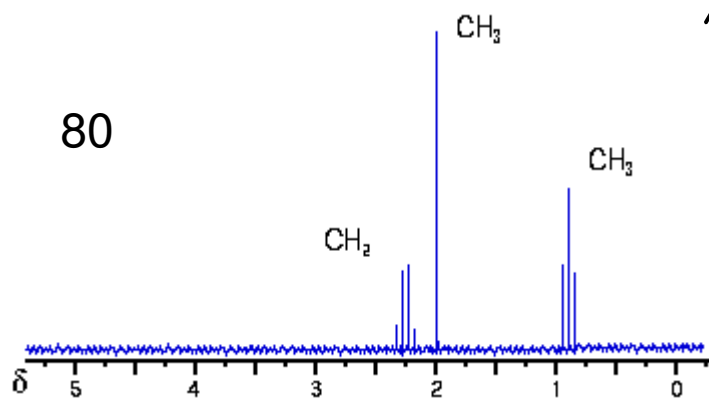
matematická operace pro separaci absorpčního signálu



Koherentní středování



$$S/N = \sqrt{N_{rep}}$$



Stabilita a homogenita magnetického pole

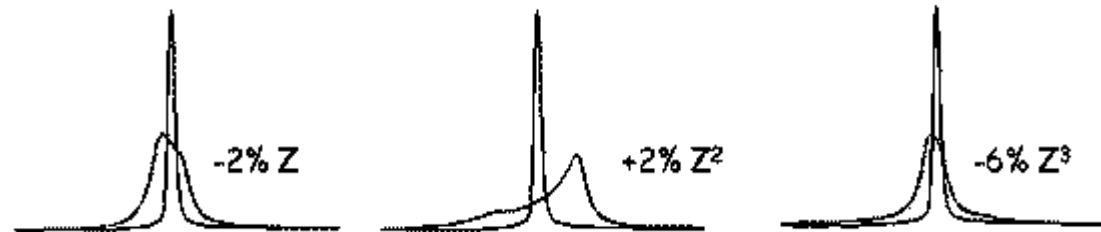
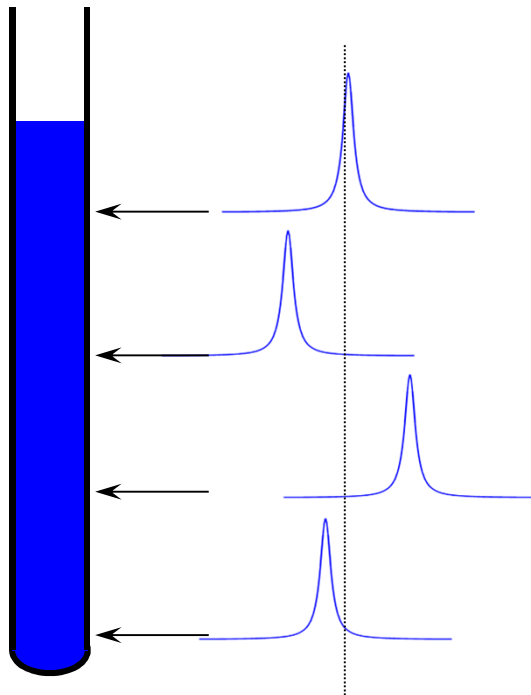
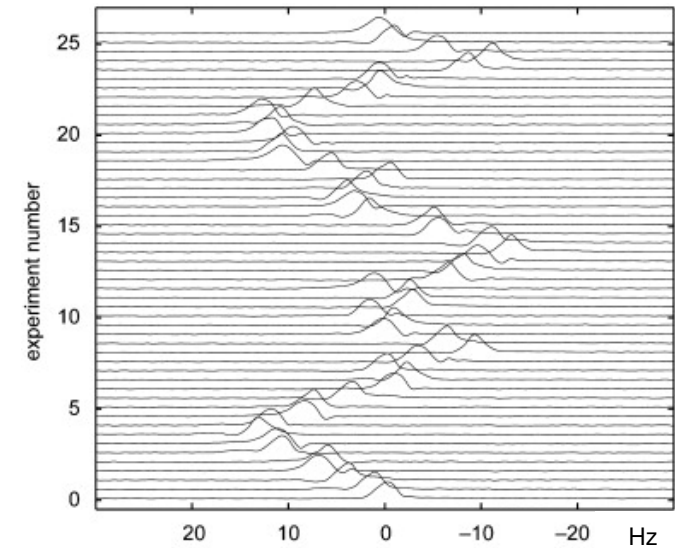
Field-frequency lock

stabilita v čase

**sledování
„nezávislého“ jádra
- deuterium**

Shim

homogenita přes vzorek



Setup Acquire Process Display Plot Setup RF Lock Scan FID Scan Eject Sample Insert Sample

Lock Shim Lock Amplitude

Z1	12949	±10	X1	-2989	±100	X3	3674	±10	Z3X	13695	±10
Z2	1139	±10	Y1	-530	±100	Y3	-351	±10	Z3Y	3983	±10
Z3	5568	±10	XZ	246	±100	XZ2	-6269	±10	Z2XZ2	8164	±10
Z4	-3113	±10	YZ	815	±100	YZ2	-2046	±10	Z2XY	2228	±10
Z5	8870	±10	XY	-18932	±100	ZXY	579	±10			
Z6	6520	±10	XZ2	-1996	±100	ZXZ2	-6470	±10			

Lock Power 26 ±1
Lock Gain 25 ±1
Lock Phase 349 ±1
Spin Rate 0 ±1
Z0 -6464 ±1

40.1

Fast Lock Update

Lock

Hardware Shimming Value: Active Shimms

Auto-find best z1 during decoupling Save shimset as: \$solvent\$ Set Background Shimm... n

NMR vzorek

Rozpouštědlo - *deuterované*

	^1H	^{13}C
CDCl_3	7,27	77,0
$\text{DMSO-}d_6$	2,50	39,5
D_2O	~4,8	
90% H_2O + 10% D_2O	~4,8	
MeOD	3,31	49,0
C_6D_6	7,16	128,0

Množství látky

1-5 mg 20-50 mg

Standardy chemického posunu

interní – TMS, DSS, dioxan, $(\text{CH}_3)_3\text{COH}$

externí – v kapiláře

