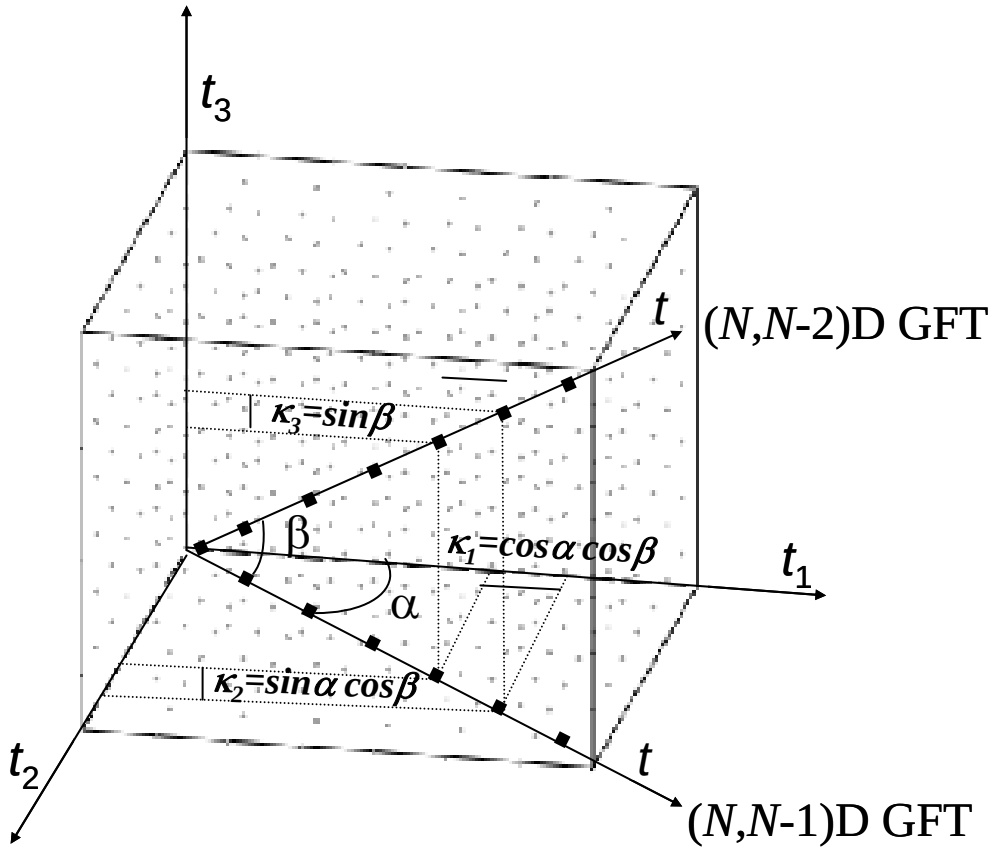
Reference Table: Projection NMR Nomenclature (JAN 2008)



Three-dimensional sub-space (N_{sub}=3) of an *N* dimensional NMR experiment. Grey dots indicate data points which need to be sampled in a conventional FT-NMR experiment, and black squares represent data points acquired 2^K (K = 3) times in a projected NMR experiment with varying sine and cosine modulations of the jointly sampled shifts. The projection tilt angles, which are adjusted by setting the scaling factors (κ) of the individual chemical shift evolution periods, are also indicated. This figure was taken from Szyperski T and Atreya H S. *Magn. Reson. Chem*. 2006; **44**: S51-S60.

Equations required to calculate scaling factors for the incrementation of jointly sampled chemical shift evolution periods from the tilt angles α, β, γ, δ, ε. For $N_{sub} = 3$, see also figure on page 1.

Dim	N_{sub}=6	N_{sub}=5	N_{sub}=4	N_{sub}=3
t_1	$\sin(\varepsilon)$	$\sin(\delta)$	$\sin(\gamma)$	$\sin(\beta)$
t_2	$\sin(\delta)\cos(\varepsilon)$	$\sin(\gamma)\cos(\delta)$	$\sin(\beta)\cos(\gamma)$	$\sin(\alpha)\cos(\beta)$
t_3	$\sin(\gamma)\cos(\delta)\cos(\varepsilon)$	$\sin(\beta)\cos(\gamma)\cos(\delta)$	$\sin(\alpha)\cos(\beta)\cos(\gamma)$	$\cos(\alpha)\cos(\beta)$
t_4	$\sin(\beta)\cos(\gamma)\cos(\delta)\cos(\varepsilon)$	$\sin(\alpha)\cos(\beta)\cos(\gamma)\cos(\delta)$	$\cos(\alpha)\cos(\beta)\cos(\gamma)$	-
t_5	$\sin(\alpha)\cos(\beta)\cos(\gamma)\cos(\delta)\cos(\varepsilon)$	$\cos(\alpha)\cos(\beta)\cos(\gamma)\cos(\delta)$	-	-
t_6	$\cos(\alpha)\cos(\beta)\cos(\gamma)\cos(\delta)\cos(\varepsilon)$	-	-	-

Research Group	*Projection NMR experiments (with Tilt angles)*	*Equivalent GFT NMR experiment(s) (with corresponding scaling factors) See Figure 1 above*
Marion and co-workers	1. 3D $^{13}C/^{15}N$ filtered NOESY[1]	(4,3)D [H<u>C</u>^{ali}]-NOESY-[<u>N</u>H][2]
Kozminski and co-workers	1. 2D RD-H<u>NCA</u>[3] 2. 2D RD-H<u>N</u>(CO)<u>CA</u>[3] 3. 2D RD-<u>HACANH</u>[3] 4. 2D DQ-H<u>N</u>{<u>CACB</u>}[4] 5. 2D DQ-H<u>N</u>(CO){<u>CACB</u>}[4] 6. 2D H<u>NCO</u>[5] 7. 2D H<u>NCA</u>[5] 8. 2D H<u>N</u>(CO)<u>CA</u>[5] 9. 2D H(N)<u>COCA</u>[5]	(3,2)D HN<u>NCA</u> [6] (3,2)D HN<u>N</u>(CO)<u>CA</u> [6] (4,2)D <u>HACAN</u>H (4,2)D HN<u>NCACB</u> (4,2)D HN<u>N</u>(CO)<u>CACB</u> (3,2)D HN<u>NCO</u> [6] (3,2)D HN<u>NCA</u> [6] (3,2)D HN<u>N</u>(CO)<u>CA</u>[6] (3,2)D HN(N)<u>COCA</u>
Brutscher and co-workers	1. 2D DQ/ZQ HNCA[7] 2. 2D DQ/ZQ HN(CO)CA[7] 3. 2D DQ/ZQ HN(CA)CB[7] 4. 2D DQ/ZQ HN(COCA)CB[7] 5. 2D DQ/ZQ HN(CA)HA[7] **6.** 2D DQ/ZQ HN(COCA)HA[7]	(3,2)D HN<u>NCA</u> [6] (3,2)D HN<u>N</u>(CO)<u>CA</u>[6] (3,2)D HN<u>N</u>(CA)<u>CB</u> [8] (3,2)D HN<u>N</u>(COCA)<u>CB</u> [6] (3,2)D HN<u>N</u>(CA)<u>HA</u> (3,2)D HN<u>N</u>(COCA)<u>HA</u>
Kupce and Freeman	**1. 3D PR-HNCO**[9] Tilt angles: $\alpha=30^0$ Tilt angles: $\alpha=0^0, 90^0$ **2. 3D PR-HNCA**[10] Tilt angles: $\alpha=\pm30^0$ Tilt angles: $\alpha=0^0, 90^0$ **3. 3D PR-HN(CO)CA**[10] Tilt angles: $\alpha=\pm60^0$ Tilt angles: $\alpha=0^0, 90^0$ **4. 4D PR-HNCOCA**[11] Tilt angles: $\alpha=\pm45^0$; $\beta=\pm45^0$ Tilt angles: $\alpha=0^0$; $\beta=0^0$ $\alpha=90^0$; $\beta=0^0$ $\alpha=0^0$; $\beta=90^0$	**1. (3,2)D HN<u>NCO</u>**[6] Scaling factors (κ): N=0.5; CO=0.87 2D [^{13}C', ^{1}H] Projection of 3D HNNCO, 2D [^{15}N, ^{1}H] HSQC **2. (3,2)D HN<u>NCA</u>**[6] Scaling factors (κ): N=0.5; CA=0.87 2D [^{13}C', ^{1}H] Projection of 3D HNNCA, 2D [^{15}N, ^{1}H] HSQC **3. (3,2)D HN<u>N</u>(CO)<u>CA</u>**[6] Scaling factors (κ): N=0.87; CA=0.5 2D [^{13}C', ^{1}H] Projection of 3D HNN(CO)CA, 2D [^{15}N, ^{1}H] HSQC **4. (4,2)D HN<u>NCOCA</u>** Scaling factors(κ): N=0.71; CO=0.5; CA=0.5 2D [^{13}C', ^{1}H] Projection of 4D HNNCOCA 2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 4D HNNCOCA 2D [^{15}N, ^{1}H] HSQC

	5. The 'TILT' experiment: 3D ^{15}N-NOESY-HSQC and ^{15}N-TOCSY-HSQC[12] Tilt angle: $\alpha=0^0$, $\alpha=\pm30^0$	**5. (3,2)D [H]-NOESY-[NH] /(3,2)D [H]-TOCSY-[NH]**[2] Scaling factors(κ): H=1.0, N=0.0 H=0.87, N=0.5
	6. Hyper-dimensional NMR using PR-NMR experiments described in 1-4 above[13]	**6. A set of (3,2)D and (4,2)D GFT NMR experiments described in 1-4 above**
Zhou and co-workers	**1. 5-D HACACONH**[14] Tilt angles: N=±60, CO=±60, CA=±60, HA=±60 Tilt angles: N=0^0, CO=90^0, CA=90^0, HA=90^0 N=90^0, CO=0^0, CA=90^0, HA=90^0 N=90^0, CO=90^0, CA=0^0, HA=90^0 N=90^0, CO=90^0, CA=90^0, HA=0^0	**1. (5,2)D HACACONHN**[15] Scaling factor (κ): N=0.5, CO=0.5, CA=0.5, HA=0.5 2D [^{15}N, ^{1}H] HSQC 2D [^{13}C', ^{1}H] Projection of 4D/5D HACACONHN 2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 4D/5D HACACONHN 2D [$^1H^{\alpha}$, ^{1}H] Projection of 4D/5D HACACONHN
	2. (4,2)D PR-HNCACB[16] Tilt angles: N=86.0^0, CA=15.5^0, CB=75.0^0 N=73.9^0, CA=33.7^0, CB=61.3^0 N=54.7^0, CA=54.7^0, CB=54.7^0 N=33.7^0, CA=73.9^0, CB=61.3^0 N=15.5^0, CA=86.0^0, CB=75.0^0 Tilt angles: N=0^0, CA=90^0, CB=90^0 N=90^0, CA=0^0, CB=90^0 N=90^0, CA=90^0, CB=0^0	**2. (4,2)D HNNCACB**[8] Scaling factors(κ): N=0.07, C^{α}=0.96, C^{β}=0.26 N=0.28, C^{α}=0.83, C^{β}=0.48 N=0.58,C^{α}=0.58, C^{β}=0.58 N=0.83, C^{α}=0.28, C^{β}=0.48 N=0.96, C^{α}=0.07, C^{β}=0.26 2D [^{15}N, ^{1}H] HSQC 2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 3D/4D HNNCACB 2D [$^{13}C^{\beta}$, ^{1}H] Projection of 4D HNNCACB
	3. (4,2)D PR-HN(CO)CACB[16] Tilt angles same as in (2)	**3. (4,2)D HNN(CO)CACB** Scaling Factors same as in (2)
	4. (4,2)D PR-Intra-HNCACB[16] Tilt angles same as in (2)	**4. (4,2)D Intra-HNNCACB** Scaling Factors same as in (2)
	5. (4,2)D PR-HNCACO[16] Tilt angles same as in (2) with CB shift evolution replaced by CO	**5. (4,2)D Intra-HNNCACO** Scaling Factors same as in (2) with C^{β} shift evolution replaced by CO
	6. (4,2)D PR-HNCOCA[16] Tilt angles same as in (2) with CA shift evolution replaced by CO and CB shift evolution replaced by CA .	**6. (4,2)D HNNCOCA** Scaling Factors same as in (2) with C^{α} replaced by CO and C^{β} replaced by CA

	7. (4,2)D PR-HNCO$_{i-1}$CA$_i$[16] Tilt angles same as in (2) with CA shift evolution replaced by CO and CB shift evolution replaced by CA	**7. (4,2)D HN<u>N</u><<u>CO</u>,<u>CA</u>>** Scaling Factors same as in (2) with C^{α} shift evolution replaced by CO and C^{β} shift evolution replaced by CA
	8. (4,2)D PR-HACANH[16] Tilt angles same as in (2) with CA shift evolution replaced by HA and CB shift evolution replaced by CA	**8. (4,2)D <u>HACAN</u>HN** Scaling Factors same as in (2) with C^{α} shift evolution replaced by HA and C^{β} shift evolution replaced by CA
	9. (4,2)D PR-HACA(CO)NH[16] Tilt angles same as in (2) with CA shift evolution replaced by HA and CB shift evolution replaced by CA	**9. (4,2)D <u>HACA</u>(CO)<u>N</u>H**[15] Tilt angles same as in (2) with CA shift evolution replaced by HA and CB shift evolution replaced by CA
	10. (4,2)D PR CH_3-N NOESY[17]	**10. (4,2)D [<u>HC</u>^{ali}]-NOESY-[<u>N</u>H]**[12]
	Tilt angles: 100 Projection angles distributed evenly in angle space: N=α_i; H= β_i; C=γ_i; i=1..100	Scaling factors(κ): N = cos(α_i), H = cos(β_i), C^{ali}= cos(γ_i); i=1..100
	11. (4,3)D HC(CO)NH-TOCSY and (4,3)D HC(C)NH-TOCSY[18]	**11. (4,3)D <u>HC</u>(CO)NH-TOCSY and (4,3)D <u>HC</u>(C)NH-TOCSY**
	Tilt angles: $\alpha=0^0$, $\pm18^0$, $\pm36^0$, $\pm54^0$, $\pm72^0$, 90^0	Scaling factors(κ): ^{1}H=1.0, 0.95, 0.81, 0.58, 0.31, 0.0 ^{13}C=0.0, 0.31, 0.58, 0.81, 0.95, 1.0
Wüthrich and co-workers	**1. 4D APSY-HNCOCA**[19]	**1. Set of (3,2)D and (4,2)D GFT NMR experiments:**
	Tilt angles: $\alpha=\pm30^0$; $\beta=0^0$ $\alpha=\pm60^0$; $\beta=0^0$	**(3,2)D HN(N)<u>COCA</u>** Scaling factors(κ): CO=0.5; CA=0.87; CO=0.87; CA=0.5
	Tilt angles: $\alpha=0^0$; $\beta=\pm30^0$ $\alpha=0^0$; $\beta=\pm60^0$	**(3,2)D HN<u>N</u>(CO)<u>CA</u>** [6] Scaling factors(κ): N=0.5; CA=0.87 N=0.87; CA=0.5
	Tilt angles: $\alpha=90^0$; $\beta=\pm30^0$ $\alpha=90^0$; $\beta=\pm60^0$	**(3,2)D HN<u>NCO</u>**[6] Scaling factors(κ): N=0.5; CO=0.87 N=0.87; CO=0.5
	Tilt angles: $\alpha=\pm30^0$; $\beta=\pm30^0$ $\alpha=\pm60^0$; $\beta=\pm30^0$ $\alpha=\pm45^0$; $\beta=\pm60^0$	**(4,2)D HN<u>NCOCA</u>** Scaling factors(κ): N=0.5; CO=0.44; CA=0.75 N=0.5; CO=0.75; CA=0.44 N=0.87; CO=0.35; CA=0.35
	Tilt angles: $\alpha=0^0$; $\beta=0^0$ $\alpha=90^0$; $\beta=0^0$ $\alpha=0^0$; $\beta=90^0$	2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 4D HNNCOCA 2D [^{13}C', ^{1}H] Projection of 4D HNNCOCA 2D [^{15}N, ^{1}H] HSQC

2. 5D APSY-HACACONH[19]	**2. Set of (3,2)D GFT NMR experiments**†
Tilt angles: $\alpha=\pm30^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=\pm60^0$; $\beta=0^0$; $\gamma=0^0$	**(3,2)D (HACA)CONHN** Scaling factors(κ): N= 0.87; CO=0.5 Scaling factors(κ): N= 0.5; CO=0.87
Tilt angles: $\alpha=0^0$; $\beta=\pm30^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=\pm60^0$; $\gamma=0^0$	**(3,2)D (HA)CA(CO)NHN** Scaling factors(κ): N= 0.87; CA=0.5 N= 0.5; CA=0.87
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm30^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm60^0$	**(3,2)D HA(CACO)NHN** Scaling factors(κ): N= 0.87; HA=0.5 N= 0.5; HA=0.87
Tilt angles: $\alpha=90^0$; $\beta=\pm30^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=\pm60^0$; $\gamma=0^0$	**(3,2)D (HA)CACO(N)HN** Scaling factors(κ): CA= 0.5; CO=0.87 CA= 0.87; CO=0.5
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm30^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm60^0$	**(3,2)D HA(CA)CO(N)HN** Scaling factors(κ): CO= 0.87; HA=0.5 CO= 0.5; HA=0.87
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm30^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm60^0$	**(3,2)D HACA(CON)HN** Scaling factors(κ): CA= 0.87; HA=0.5 CA= 0.5; HA=0.87
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$	2D [^{15}N, ^{1}H] HSQC 2D [^{13}C', ^{1}H] Projection of 4D HNNCOCA 2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 4D HNNCOCA 2D [$^{1}H^{\alpha}$, ^{1}H] Projection of 4D HNNCOCA
3. 5D APSY-HNCOCACB[21]	**3. Set of (3,2)D, (4,2)D and (5,2)D GFT NMR experiments:**
Tilt angles: $\alpha=\pm35^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=\pm70^0$; $\beta=0^0$; $\gamma=0^0$	**(3,2)D HN(NCO)CACB** Scaling factors(κ): CB=0.57; CA=0.82; CB=0.94; CA=0.34;
Tilt angles: $\alpha=0^0$; $\beta=\pm41^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=\pm82$; $\gamma=0^0$	**(3,2)D HN(N)COCA(CB)** Scaling factors(κ): CO=0.66; CA=0.75; CO=0.99; CA=0.14;
Tilt angles: $\alpha=90^0$; $\beta=\pm42^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=\pm84$; $\gamma=0^0$	**(3,2)D HN(N)CO(CA)CB** Scaling factors(κ): CO=0.67; CB=0.74; CO=0.99; CB=0.11;
Tilt angles: $\alpha=0^0$; $\beta=\pm90^0$; $\gamma=17^0$ $\alpha=0^0$; $\beta=\pm90$; $\gamma=35^0$	**(3,2)D HNNCO(CACB)**[6] Scaling factors(κ): N=0.29; CO=0.96; N=0.57; CO=0.82;
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm32^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm75^0$	**(3,2)D HNN(CO)CA(CB)**[6] Scaling factors(κ): N=0.53; CA=0.85; N=0.97; CA=0.26;

† (3,2)D congener of (5,2)D HACACONHN of ref 15.

Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm41^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm82^0$	**(3,2)D HN<u>N</u>(COCA)<u>CB</u>** Scaling factors(κ): N=0.66; CB=0.75; N=0.99; CB=0.14;
Tilt angles: $\alpha=0^0$; $\beta=\pm41^0$; $\gamma=\pm60^0$ $\alpha=0^0$; $\beta=\pm82^0$; $\gamma=\pm60^0$ $\alpha=0^0$; $\beta=\pm82^0$; $\gamma=\pm30^0$	**(4,2)D HN<u>N</u><u>CO</u>CA(CB)** Scaling factors(κ): N=0.87; CO=0.33; CA=0.38; N=0.87; CO=0.50; CA=0.07; N=0.50; CO=0.86; CA=0.12;
Tilt angles: $\alpha=90^0$; $\beta=\pm84^0$; $\gamma=\pm66^0$	**(4,2)D HN<u>N</u><u>CO</u>(CA)<u>CB</u>** Scaling factors(κ): N=0.91; CO=0.41; CB=0.04;
Tilt angles: $\alpha=\pm35^0$; $\beta=\pm66^0$; $\gamma=0^0$	**(4,2)D HN(N)<u>COCACB</u>** Scaling factors(κ): CO=0.91; CA=0.33; CB=0.23;
Tilt angles: $\alpha=\pm35^0$; $\beta=0^0$; $\gamma=\pm60^0$	**(4,2)D HN<u>N</u>(CO)<u>CACB</u>** Scaling factors(κ): N=0.87; CA=0.41; CB=0.29;
Tilt angles: $\alpha=\pm35^0$; $\beta=\pm66^0$; $\gamma=\pm50^0$	**(5,2)D HN<u>N</u><u>CO</u><u>CA</u><u>CB</u>** Scaling factors(κ): N=0.77; CO=0.59; CA=0.21; CB=0.15;
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$	2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 3D HNN(CO)CA 2D [$^{13}C^{\beta}$, ^{1}H] Projection of 4D HNN(CO)CACB 2D [$^{13}C'$, ^{1}H] Projection of 3D HNCO 2D [^{15}N, ^{1}H] HSQC
4. 6D APSY-HNCACONH[20]	**4. Set of (3,2)D GFT NMR experiments:**
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=\pm30^0$	**(3,2)D <u>HNN</u>(COCAN)HN** Scaling factors(κ): N= 0.87; HN=0.5
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=\pm60^0$	**(3,2)D <u>HN</u>(N)<u>CO</u>(CAN)HN** Scaling factors(κ): CO= 0.5; HN=0.87
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm30^0$	**(3,2)D <u>HN</u>(NCO)<u>CA</u>(N)HN** Scaling factors(κ): CA= 0.87; HN=0.5
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm30^0$	**(3,2)D <u>HN</u>(NCOCA)<u>N</u>HN** Scaling factors(κ): N= 0.5; HN=0.87
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm30^0$; $\delta=0^0$	**(3,2)D (HN)<u>NCO</u>(CAN)HN** Scaling factors(κ): CO= 0.87; N=0.5
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm60^0$; $\delta=0^0$	**(3,2)D (HN)<u>N</u>(CO)<u>CA</u>(N)HN** Scaling factors(κ): CA= 0.5; N=0.87

Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm30^0$; $\delta=0^0$	**(3,2)D (HN)<u>N</u>(COCA)<u>N</u>HN** Scaling factors(κ): CA= 0.87; N=0.5
Tilt angles: $\alpha=90^0$; $\beta=\pm60^0$; $\gamma=0^0$; $\delta=0^0$	**(3,2)D (HNN)<u>COCA</u>(N)HN** Scaling factors(κ): CA= 0.5; CO=0.87
Tilt angles: $\alpha=0^0$; $\beta=\pm30^0$; $\gamma=0^0$; $\delta=0^0$	**(3,2)D (HNN)<u>CO</u>(CA)<u>N</u>HN** Scaling factors(κ): CA= 0.87; CO=0.5
Tilt angles: $\alpha=\pm30^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$	**(3,2)D (HNNCO)<u>CAN</u>HN** Scaling factors(κ): N= 0.87; CA=0.5
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=90^0$	2D [^{15}N, ^{1}H] HSQC 2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 3D HNNCA 2D [^{13}C', ^{1}H] Projection of 3D HNN(CA)CO 2D [^{15}N, ^{1}H] Projection of 3D HNNCO 2D [^{1}H, ^{1}H] Projection of 4D HNNCOCA
5. 7D APSY-seq-HNCO(CA)CBCANH[21]	**5. Set of (3,2)D and (4,2)D GFT NMR experiments:**
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=\pm31^0$; $\varepsilon=0^0$	**(3,2)D (HN)<u>NCO</u>(CACBCAN)HN** Scaling factors(κ): N= 0.51; CO=0.86
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm77^0$; $\varepsilon=0^0$	**(3,2)D (HN)<u>N</u>(COCACB)<u>CA</u>(N)HN** Scaling factors(κ): N= 0.97; CA=0.23
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=\pm80^0$; $\varepsilon=0^0$	**(3,2)D (HN)<u>N</u>(COCA)<u>CB</u>(CAN)HN** Scaling factors(κ): N= 0.98; CB=0.17
Tilt angles: $\alpha=\pm13^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$	**(3,2)D (HNNCOCACB)<u>CAN</u>HN** Scaling factors(κ): CA= 0.22; N=0.97
Tilt angles: $\alpha=0^0$; $\beta=\pm9.5^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$	**(3,2)D (HNNCOCA)<u>CB</u>(CA)<u>N</u>HN** Scaling factors(κ): CB= 0.16; N=0.99
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm30^0$; $\delta=0^0$; $\varepsilon=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm59.3^0$; $\delta=0^0$; $\varepsilon=0^0$	**(3,2)D (HNN)<u>CO</u>(CACBCA)<u>N</u>HN** Scaling factors(κ): CO= 0.50; N=0.87 CO= 0.86; N=0.51
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=0^0$; $\varepsilon=\pm27^0$	**(3,2)D <u>HN</u>(N)<u>CO</u>(CACBCAN)NH** Scaling factors(κ): HN= 0.45; CO=0.89
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm33^0$	**(3,2)D <u>HN</u>(NCOCACBCA)<u>N</u>NH** Scaling factors(κ): HN= 0.54; N=0.84
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm42^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm84^0$	**(3,2)D <u>HN</u>(NCOCACB)<u>CA</u>(N)NH** Scaling factors(κ): HN= 0.67; CA=0.74 HN= 0.99; CA=0.11

Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=\pm15^0$; $\varepsilon=0^0$	**(3,2)D (HN)<u>NCO</u>(CACBCAN)NH** Scaling factors(κ): N= 0.26; CO=0.97
Tilt angles: $\alpha=\pm13^0$; $\beta=\pm9.3^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$	**(4,2)D (HNNCOCA)<u>CBCAN</u>HN** Scaling factors(κ): CB= 0.16; CA= 0.22; N=0.96
Tilt angles: $\alpha=0^0$; $\beta=\pm9.5^0$; $\gamma=\pm58.9^0$; $\delta=0^0$; $\varepsilon=0^0$	**(4,2)D (HNN)<u>CO</u>(CA)<u>CB</u>(CA)<u>N</u>HN** Scaling factors(κ): CO= 0.86; CB= 0.09; N=0.51
Tilt angles: $\alpha=90^0$; $\beta=\pm36^0$; $\gamma=\pm80.4^0$; $\delta=0^0$; $\varepsilon=0^0$	**(4,2)D (HNN)<u>CO</u>(CA)<u>CBCA(</u>N)HN** Scaling factors(κ): CO= 0.99; CB= 0.10; CA=0.14
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm30^0$; $\delta=0^0$; $\varepsilon=\pm25^0$	**(4,2)D <u>HN</u>(N)<u>CO</u>(CACBCA)<u>N</u>NH** Scaling factors(κ): HN= 0.42; CO= 0.45; N=0.79
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm41^0$; $\delta=0^0$; $\varepsilon=\pm27^0$	**(4,2)D <u>HN</u>(N)<u>COCA</u>(CBCAN)NH** Scaling factors(κ): HN= 0.45; CO= 0.58; CA=0.67
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm23^0$; $\varepsilon=\pm29^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm45^0$; $\varepsilon=\pm58.6^0$	**(4,2)D <u>HNN</u>(COCACBCA)<u>N</u>NH** Scaling factors(κ): HN= 0.48; N= 0.34; N^i=0.81 HN= 0.85; N= 0.37; N^i=0.37
Tilt angles: $\alpha=\pm52^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm33^0$	**(4,2)D <u>HN</u>(NCOCACB)<u>CAN</u>NH** Scaling factors(κ): HN= 0.54; CA= 0.66; N=0.52
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm38^0$; $\varepsilon=\pm33^0$	**(4,2)D <u>HNN</u>(COCACB)<u>CA(</u>N)NH** Scaling factors(κ): HN= 0.54; N= 0.52; CA=0.66
Tilt angles: $\alpha=90^0$; $\beta=\pm63^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm41^0$	**(4,2)D <u>HN(</u>NCOCA)CA<u>CB(</u>N)NH** Scaling factors(κ): HN= 0.66; CB= 0.67; CA=0.34
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=\pm80.5^0$; $\varepsilon=\pm66.3^0$	**(4,2)D <u>HNN</u>(COCA)<u>CB</u>(CAN)NH** Scaling factors(κ): HN= 0.92; N= 0.40; CB=0.07
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm59.3^0$; $\delta=\pm27.1^0$; $\varepsilon=0^0$	**(4,2)D (HN)<u>NCO</u>(CACBCA)<u>N</u>NH** Scaling factors(κ): N= 0.46; CO= 0.77; N^i =0.45
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm82.2^0$; $\delta=\pm30.5^0$; $\varepsilon=0^0$	**(4,2)D (HN)<u>NCO</u>(CACB)<u>CA(</u>N)NH** Scaling factors(κ): N= 0.51; CO= 0.85; CA =0.12
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm84.3^0$; $\delta=\pm30.6^0$; $\varepsilon=0^0$	**(4,2)D (HN)<u>NCO</u>(CA)<u>CB</u>(CAN)NH** Scaling factors(κ): N= 0.51; CO= 0.86; CB =0.09

	Tilt angles: $\alpha=\pm13^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm44.3^0$; $\varepsilon=0^0$	**(4,2)D (HN)N(CO)CA(CBCA)NNH** Scaling factors(κ): N= 0.70; CA= 0.16; N^i =0.70
	Tilt angles: $\alpha=0^0$; $\beta=\pm9.5^0$; $\gamma=0^0$; $\delta=\pm44.6^0$; $\varepsilon=0^0$	**(4,2)D (HN)N(COCA)CB(CA)NNH** Scaling factors(κ): N= 0.70; CB= 0.12; N^i =0.70
	Tilt angles: $\alpha=90^0$; $\beta=\pm36^0$; $\gamma=0^0$; $\delta=\pm74^0$; $\varepsilon=0^0$	**(4,2)D (HN)N(CO)CACB(CAN)NH** Scaling factors(κ): N= 0.96; CB= 0.16; CA =0.22
	Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$ $\alpha=90^0$;$\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=0^0$; $\varepsilon=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=90^0$; $\varepsilon=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=90^0$	2D [^{15}N, ^{1}H] HSQC 2D [$^{13}C^{\alpha}$, ^{1}H] Projection of 3D HNNCA 2D [$^{13}C^{\beta}$, ^{1}H] Projection of 4D HNNCACB 2D [^{13}C', ^{1}H] Projection of 3D HNN(CA)CO 2D [^{15}N, ^{1}H] Projection of 3D HNN(CACO)N 2D [^{1}H, ^{1}H] Projection of 3D HN(NCOCA)NHN
Wagner and co-workers	**3D RD-HCcoNH-TOCSY**[22]	**(4,3)D HC(CO)NHN-TOCSY**
Markley and co-workers	**1. 3D HNCO**[23] Tilt angles: $\alpha=50^0$, 35^0, 10^0, 70^0, 20^0, 25^0, 45^0 **2. 3D HNCACB**[23] Tilt angles: $\alpha=20^0$, 10^0, 30^0, 40^0, 50^0, 60^0, 70^0 **3. 3D CBCA(CO)NHN**[23] Tilt angles: $\alpha=50^0$, 55^0, 40^0, 70^0, 30^0, 65^0, 20^0	**1. (3,2)D HNNCO**[6] Scaling factors(κ): N=0.76, 0.57, 0.17, 0.94, 0.34, 0.42, 0.71 CO =0.64, 0.82, 0.98, 0.34, 0.94, 0.90, 0.71 **2. (3,2)D HNNCACB**[6] Scaling factors(κ): N=0.34, 0.17, 0.50, 0.64, 0.76, 0.87, 0.94 CA/CB=0.94, 0.98, 0.87, 0.76, 0.64, 0.50, 0.34 **3. (3,2)D CBCA(CO)NHN**[6] Scaling factors(κ): N=0.76, 0.82, 0.65, 0.94, 0.87, 0.90, 0.34 CA/CB=0.64, 0.57, 0.76, 0.34, 0.50, 0.42, 0.94

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