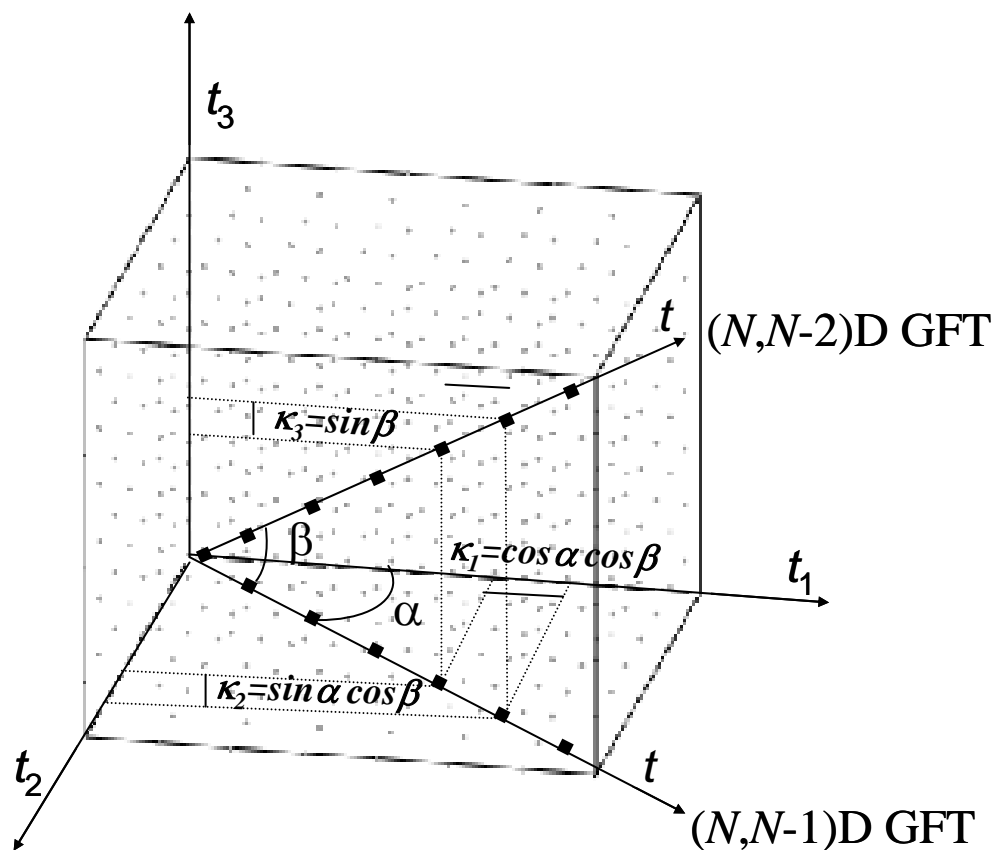


Reference Table: Projection NMR Nomenclature (July 2009)



Three-dimensional sub-space ($N_{\text{sub}}=3$) 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 $N_{\text{sub}} = 3$, see also figure on page 1.

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

<i>Research Group</i>	<i>Projection NMR experiments (with Tilt angles)</i>	<i>Equivalent GFT NMR experiment(s) (with corresponding scaling factors) See Figure 1 above</i>
Marion and co-workers	1. 3D $^{13}\text{C}/^{15}\text{N}$ filtered NOESY ¹	(4,3)D $[\text{HC}^{\text{ali}}]\text{-NOESY-}[\text{NH}]^2$
Kozminski and co-workers	1. 2D RD- HNCA^3 2. 2D RD- $\text{HN}(\text{CO})\text{CA}^3$ 3. 2D RD- HACANH^3 4. 2D DQ- $\text{HN}\{\text{CACB}\}^4$ 5. 2D DQ- $\text{HN}(\text{CO})\{\text{CACB}\}^4$ 6. 2D HNCO^5 7. 2D HNCA^5 8. 2D $\text{HN}(\text{CO})\text{CA}^5$ 9. 2D $\text{H}(\text{N})\text{COCA}^5$	(3,2)D HNNCA^6 (3,2)D $\text{HNN}(\text{CO})\text{CA}^6$ (4,2)D HACANH (4,2)D HNNCACB (4,2)D $\text{HNN}(\text{CO})\text{CACB}$ (3,2)D HNNCO^6 (3,2)D HNNCA^6 (3,2)D $\text{HNN}(\text{CO})\text{CA}^6$ (3,2)D $\text{HN}(\text{N})\text{COCA}$
Brutscher and co-workers	1. 2D DQ/ZQ HNCA^7 2. 2D DQ/ZQ $\text{HN}(\text{CO})\text{CA}^7$ 3. 2D DQ/ZQ $\text{HN}(\text{CA})\text{CB}^7$ 4. 2D DQ/ZQ $\text{HN}(\text{COCA})\text{CB}^7$ 5. 2D DQ/ZQ $\text{HN}(\text{CA})\text{HA}^7$ 6. 2D DQ/ZQ $\text{HN}(\text{COCA})\text{HA}^7$	(3,2)D HNNCA^6 (3,2)D $\text{HNN}(\text{CO})\text{CA}^6$ (3,2)D $\text{HNN}(\text{CA})\text{CB}^8$ (3,2)D $\text{HNN}(\text{COCA})\text{CB}^6$ (3,2)D $\text{HNN}(\text{CA})\text{HA}$ (3,2)D $\text{HNN}(\text{COCA})\text{HA}$
Kupce and Freeman	1. 3D PR-HNCO⁹ Tilt angles: $\alpha=30^0$ Tilt angles: $\alpha=0^0, 90^0$ 2. 3D PR-HNCA¹⁰ Tilt angles: $\alpha=\pm 30^0$ Tilt angles: $\alpha=0^0, 90^0$ 3. 3D PR-HN(CO)CA¹⁰ Tilt angles: $\alpha=\pm 60^0$ Tilt angles: $\alpha=0^0, 90^0$ 4. 4D PR-HNCOCA¹¹ Tilt angles: $\alpha=\pm 45^0; \beta=\pm 45^0$ Tilt angles: $\alpha=0^0; \beta=0^0$ $\alpha=90^0; \beta=0^0$ $\alpha=0^0; \beta=90^0$	1. (3,2)D HNNCO⁶ Scaling factors (κ): N=0.5; CO=0.87 2D [$^{13}\text{C}'$, ^1H] Projection of 3D HNNCO, 2D [^{15}N , ^1H] HSQC 2. (3,2)D HNNCA⁶ Scaling factors (κ): N=0.5; CA=0.87 2D [$^{13}\text{C}'$, ^1H] Projection of 3D HNNCA, 2D [^{15}N , ^1H] HSQC 3. (3,2)D HNN(CO)CA⁶ Scaling factors (κ): N=0.87; CA=0.5 2D [$^{13}\text{C}'$, ^1H] Projection of 3D HNN(CO)CA, 2D [^{15}N , ^1H] HSQC 4. (4,2)D HNNCOCA Scaling factors(κ): N=0.71; CO=0.5; CA=0.5 2D [$^{13}\text{C}'$, ^1H] Projection of 4D HNNCOCA 2D [$^{13}\text{C}^\alpha$, ^1H] Projection of 4D HNNCOCA 2D [^{15}N , ^1H] HSQC

	<p>5. The 'TILT' experiment: 3D ^{15}N-NOESY-HSQC and ^{15}N-TOCSY-HSQC¹² Tilt angle: $\alpha=0^0$, $\alpha=\pm 30^0$</p> <p>6. Hyper-dimensional NMR using PR-NMR experiments described in 1-4 above¹³</p>	<p>5. (3,2)D $[\underline{\text{H}}]$-NOESY-$[\underline{\text{NH}}]$ / (3,2)D $[\underline{\text{H}}]$-TOCSY-$[\underline{\text{NH}}]$² Scaling factors(κ): H=1.0, N=0.0 H=0.87, N=0.5</p> <p>6. A set of (3,2)D and (4,2)D GFT NMR experiments described in 1-4 above</p>
<p>Zhou and co-workers</p>	<p>1. 5-D HACACONH¹⁴ Tilt angles: N=± 60, CO=± 60, CA=± 60, HA=± 60</p> <p>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</p> <p>2. (4,2)D PR-HNCACB¹⁶ 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</p> <p>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</p> <p>3. (4,2)D PR-HN(CO)CACB¹⁶ Tilt angles same as in (2)</p> <p>4. (4,2)D PR-Intra-HNCACB¹⁶ Tilt angles same as in (2)</p> <p>5. (4,2)D PR-HNCACO¹⁶ Tilt angles same as in (2) with CB shift evolution replaced by CO</p> <p>6. (4,2)D PR-HNCOCA¹⁶ Tilt angles same as in (2) with CA shift evolution replaced by CO and CB shift evolution replaced by CA</p>	<p>1. (5,2)D HACACONHN¹⁵ Scaling factor (κ): N=0.5, CO=0.5, CA=0.5, HA=0.5</p> <p>2D [^{15}N, ^1H] HSQC 2D [^{13}C, ^1H] Projection of 4D/5D HACACONHN 2D [$^{13}\text{C}^\alpha$, ^1H] Projection of 4D/5D HACACONHN 2D [$^1\text{H}^\alpha$, ^1H] Projection of 4D/5D HACACONHN</p> <p>2. (4,2)D HNNCACB⁸ Scaling factors(κ): N=0.07, $\text{C}^\alpha=0.96$, $\text{C}^\beta=0.26$ N=0.28, $\text{C}^\alpha=0.83$, $\text{C}^\beta=0.48$ N=0.58, $\text{C}^\alpha=0.58$, $\text{C}^\beta=0.58$ N=0.83, $\text{C}^\alpha=0.28$, $\text{C}^\beta=0.48$ N=0.96, $\text{C}^\alpha=0.07$, $\text{C}^\beta=0.26$</p> <p>2D [^{15}N, ^1H] HSQC 2D [$^{13}\text{C}^\alpha$, ^1H] Projection of 3D/4D HNNCACB 2D [$^{13}\text{C}^\beta$, ^1H] Projection of 4D HNNCACB</p> <p>3. (4,2)D HNN(CO)CACB Scaling Factors same as in (2)</p> <p>4. (4,2)D Intra-HNNCACB Scaling Factors same as in (2)</p> <p>5. (4,2)D Intra-HNNCACO Scaling Factors same as in (2) with C^β shift evolution replaced by CO</p> <p>6. (4,2)D HNNCOCA Scaling Factors same as in (2) with C^α replaced by CO and C^β replaced by CA</p>

	<p>7. (4,2)D PR-HNCO_{i-1}CA_i¹⁶ Tilt angles same as in (2) with CA shift evolution replaced by CO and CB shift evolution replaced by CA</p> <p>8. (4,2)D PR-HACANH¹⁶ Tilt angles same as in (2) with CA shift evolution replaced by HA and CB shift evolution replaced by CA</p> <p>9. (4,2)D PR-HACA(CO)NH¹⁶ Tilt angles same as in (2) with CA shift evolution replaced by HA and CB shift evolution replaced by CA</p> <p>10. (4,2)D PR CH₃-N NOESY¹⁷ Tilt angles: 100 Projection angles distributed evenly in angle space: N=α_i; H=β_i; C=γ_i; i=1..100</p> <p>11. (4,3)D HC(CO)NH-TOCSY and (4,3)D HC(C)NH-TOCSY¹⁸ Tilt angles: α=0⁰, ±18⁰, ±36⁰, ±54⁰, ±72⁰, 90⁰</p>	<p>7. (4,2)D HNN<CO,CA> Scaling Factors same as in (2) with C^α shift evolution replaced by CO and C^β shift evolution replaced by CA</p> <p>8. (4,2)D HACANH Scaling Factors same as in (2) with C^α shift evolution replaced by HA and C^β shift evolution replaced by CA</p> <p>9. (4,2)D HACA(CO)NH¹⁵ Tilt angles same as in (2) with CA shift evolution replaced by HA and CB shift evolution replaced by CA</p> <p>10. (4,2)D [HC^{ali}]-NOESY-[NH]¹² Scaling factors(κ): N = cos(α_i), H = cos(β_i), C^{ali} = cos(γ_i); i=1..100</p> <p>11. (4,3)D HC(CO)NH-TOCSY and (4,3)D HC(C)NH-TOCSY Scaling factors(κ): ¹H=1.0, 0.95, 0.81, 0.58, 0.31, 0.0 ¹³C=0.0, 0.31, 0.58, 0.81, 0.95, 1.0</p>
<p>Wüthrich and co-workers</p>	<p>1. 4D APSY-HNCOCA¹⁹ Tilt angles: α=±30⁰; β=0⁰ α=±60⁰; β=0⁰</p> <p>Tilt angles: α=0⁰; β=±30⁰ α=0⁰; β=±60⁰</p> <p>Tilt angles: α=90⁰; β=±30⁰ α=90⁰; β=±60⁰</p> <p>Tilt angles: α=±30⁰; β=±30⁰ α=±60⁰; β=±30⁰ α=±45⁰; β=±60⁰</p> <p>Tilt angles: α=0⁰; β=0⁰ α=90⁰; β=0⁰ α=0⁰; β=90⁰</p>	<p>1. Set of (3,2)D and (4,2)D GFT NMR experiments:</p> <p>(3,2)D HN(N)COCA Scaling factors(κ): CO=0.5; CA=0.87; CO=0.87; CA=0.5</p> <p>(3,2)D HNN(CO)CA⁶ Scaling factors(κ): N=0.5; CA=0.87 N=0.87; CA=0.5</p> <p>(3,2)D HNNCO⁶ Scaling factors(κ): N=0.5; CO=0.87 N=0.87; CO=0.5</p> <p>(4,2)D HNNCOCA 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</p> <p>2D [¹³C^α, ¹H] Projection of 4D HNNCOCA 2D [¹³C^β, ¹H] Projection of 4D HNNCOCA 2D [¹⁵N, ¹H] HSQC</p>

<p>2. 5D APSY-HACACONH¹⁹</p> <p>Tilt angles: $\alpha=\pm 30^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=\pm 60^0$; $\beta=0^0$; $\gamma=0^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=\pm 30^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=\pm 60^0$; $\gamma=0^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 30^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 60^0$</p> <p>Tilt angles: $\alpha=90^0$; $\beta=\pm 30^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=\pm 60^0$; $\gamma=0^0$</p> <p>Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 30^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 60^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm 30^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm 60^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$</p>	<p>2. Set of (3,2)D GFT NMR experiments[†]</p> <p>(3,2)D (HACA)CONHN Scaling factors(κ): N= 0.87; CO=0.5 Scaling factors(κ): N= 0.5; CO=0.87</p> <p>(3,2)D (HA)CA(CO)NHN Scaling factors(κ): N= 0.87; CA=0.5 N= 0.5; CA=0.87</p> <p>(3,2)D HA(CACO)NHN Scaling factors(κ): N= 0.87; HA=0.5 N= 0.5; HA=0.87</p> <p>(3,2)D (HA)CACO(N)HN Scaling factors(κ): CA= 0.5; CO=0.87 CA= 0.87; CO=0.5</p> <p>(3,2)D HA(CA)CO(N)HN Scaling factors(κ): CO= 0.87; HA=0.5 CO= 0.5; HA=0.87</p> <p>(3,2)D HACA(CON)HN Scaling factors(κ): CA= 0.87; HA=0.5 CA= 0.5; HA=0.87</p> <p>2D [¹⁵N, ¹H] HSQC 2D [¹³C', ¹H] Projection of 4D HNNCOCA 2D [¹³C^α, ¹H] Projection of 4D HNNCOCA 2D [¹H^α, ¹H] Projection of 4D HNNCOCA</p>
<p>3. 5D APSY-HNCOCACB²¹</p> <p>Tilt angles: $\alpha=\pm 35^0$; $\beta=0^0$; $\gamma=0^0$ $\alpha=\pm 70^0$; $\beta=0^0$; $\gamma=0^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=\pm 41^0$; $\gamma=0^0$ $\alpha=0^0$; $\beta=\pm 82$; $\gamma=0^0$</p> <p>Tilt angles: $\alpha=90^0$; $\beta=\pm 42^0$; $\gamma=0^0$ $\alpha=90^0$; $\beta=\pm 84$; $\gamma=0^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=\pm 90^0$; $\gamma=17^0$ $\alpha=0^0$; $\beta=\pm 90$; $\gamma=35^0$</p> <p>Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 32^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 75^0$</p>	<p>3. Set of (3,2)D, (4,2)D and (5,2)D GFT NMR experiments:</p> <p>(3,2)D HN(NCO)CACB Scaling factors(κ): CB=0.57; CA=0.82; CB=0.94; CA=0.34;</p> <p>(3,2)D HN(N)COCA(CB) Scaling factors(κ): CO=0.66; CA=0.75; CO=0.99; CA=0.14;</p> <p>(3,2)D HN(N)CO(CA)CB Scaling factors(κ): CO=0.67; CB=0.74; CO=0.99; CB=0.11;</p> <p>(3,2)D HNNCO(CACB)⁶ Scaling factors(κ): N=0.29; CO=0.96; N=0.57; CO=0.82;</p> <p>(3,2)D HNN(CO)CA(CB)⁶ Scaling factors(κ): N=0.53; CA=0.85; N=0.97; CA=0.26;</p>

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

Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 41^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 82^0$	(3,2)D <u>HNN(COCA)CB</u> Scaling factors(κ): N=0.66; CB=0.75; N=0.99; CB=0.14;
Tilt angles: $\alpha=0^0$; $\beta=\pm 41^0$; $\gamma=\pm 60^0$ $\alpha=0^0$; $\beta=\pm 82^0$; $\gamma=\pm 60^0$ $\alpha=0^0$; $\beta=\pm 82^0$; $\gamma=\pm 30^0$	(4,2)D <u>HNNCOCA(CB)</u> 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: $\alpha=90^0$; $\beta=\pm 84^0$; $\gamma=\pm 66^0$	(4,2)D <u>HNNCO(CA)CB</u> Scaling factors(κ): N=0.91; CO=0.41; CB=0.04;
Tilt angles: $\alpha=\pm 35^0$; $\beta=\pm 66^0$; $\gamma=0^0$	(4,2)D <u>HN(N)COCACB</u> Scaling factors(κ): CO=0.91; CA=0.33; CB=0.23;
Tilt angles: $\alpha=\pm 35^0$; $\beta=0^0$; $\gamma=\pm 60^0$	(4,2)D <u>HNN(CO)CACB</u> Scaling factors(κ): N=0.87; CA=0.41; CB=0.29;
Tilt angles: $\alpha=\pm 35^0$; $\beta=\pm 66^0$; $\gamma=\pm 50^0$	(5,2)D <u>HNNCOCACB</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 [$^{13}\text{C}^\alpha$, ^1H] Projection of 3D HNN(CO)CA 2D [$^{13}\text{C}^\beta$, ^1H] Projection of 4D HNN(CO)CACB 2D [$^{13}\text{C}'$, ^1H] Projection of 3D HNCO 2D [^{15}N , ^1H] HSQC
4. 6D APSY-HNCACONH²⁰	4. Set of (3,2)D GFT NMR experiments:
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=\pm 30^0$	(3,2)D <u>HNN(COCAN)HN</u> Scaling factors(κ): N= 0.87; HN=0.5
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=\pm 60^0$	(3,2)D <u>HN(N)CO(CAN)HN</u> Scaling factors(κ): CO= 0.5; HN=0.87
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm 30^0$	(3,2)D <u>HN(NCO)CA(N)HN</u> Scaling factors(κ): CA= 0.87; HN=0.5
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm 30^0$	(3,2)D <u>HN(NCOCA)NHN</u> Scaling factors(κ): N= 0.5; HN=0.87
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm 30^0$; $\delta=0^0$	(3,2)D <u>(HN)NCO(CAN)HN</u> Scaling factors(κ): CO= 0.87; N=0.5
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 60^0$; $\delta=0^0$	(3,2)D <u>(HN)N(CO)CA(N)HN</u> Scaling factors(κ): CA= 0.5; N=0.87

Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 30^0$; $\delta=0^0$	(3,2)D (HN)<u>N</u>(COCA)<u>N</u>HN Scaling factors(κ): CA= 0.87; N=0.5
Tilt angles: $\alpha=90^0$; $\beta=\pm 60^0$; $\gamma=0^0$; $\delta=0^0$	(3,2)D (HNN)<u>COCA</u>(N)HN Scaling factors(κ): CA= 0.5; CO=0.87
Tilt angles: $\alpha=0^0$; $\beta=\pm 30^0$; $\gamma=0^0$; $\delta=0^0$	(3,2)D (HNN)<u>CO</u>(CA)<u>N</u>HN Scaling factors(κ): CA= 0.87; CO=0.5
Tilt angles: $\alpha=\pm 30^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$	(3,2)D (HNNCO)<u>CA</u>NHN 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 , ^1H] HSQC 2D [$^{13}\text{C}^\alpha$, ^1H] Projection of 3D HNNCA 2D [$^{13}\text{C}'$, ^1H] Projection of 3D HNN(CA)CO 2D [^{15}N , ^1H] Projection of 3D HNNCO 2D [^1H , ^1H] Projection of 4D HNNCOCA
5. 7D APSY-seq-HNCO(CA)CBCANH²¹	5. Set of (3,2)D and (4,2)D GFT NMR experiments:
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=\pm 31^0$; $\varepsilon=0^0$	(3,2)D (HN)<u>N</u>CO(CACBCAN)HN Scaling factors(κ): N= 0.51; CO=0.86
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm 77^0$; $\varepsilon=0^0$	(3,2)D (HN)<u>N</u>(COCACB)<u>CA</u>(N)HN Scaling factors(κ): N= 0.97; CA=0.23
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=\pm 80^0$; $\varepsilon=0^0$	(3,2)D (HN)<u>N</u>(COCA)<u>CB</u>(CAN)HN Scaling factors(κ): N= 0.98; CB=0.17
Tilt angles: $\alpha=\pm 13^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$	(3,2)D (HNNCOCACB)<u>CA</u>NHN Scaling factors(κ): CA= 0.22; N=0.97
Tilt angles: $\alpha=0^0$; $\beta=\pm 9.5^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$	(3,2)D (HNNCOCA)<u>CB</u>(CA)<u>N</u>HN Scaling factors(κ): CB= 0.16; N=0.99
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 30^0$; $\delta=0^0$; $\varepsilon=0^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 59.3^0$; $\delta=0^0$; $\varepsilon=0^0$	(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: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=0^0$; $\varepsilon=\pm 27^0$	(3,2)D <u>HN</u>(N)<u>CO</u>(CACBCAN)NH Scaling factors(κ): HN= 0.45; CO=0.89
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm 33^0$	(3,2)D <u>HN</u>(NCOCACBCA)<u>N</u>NH Scaling factors(κ): HN= 0.54; N=0.84
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm 42^0$ $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm 84^0$	(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: $\alpha=0^0$; $\beta=0^0$; $\gamma=90^0$; $\delta=\pm 15^0$; $\varepsilon=0^0$	(3,2)D (HN)NCO(CACBCAN)NH Scaling factors(κ): N= 0.26; CO=0.97
Tilt angles: $\alpha=\pm 13^0$; $\beta=\pm 9.3^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=0^0$	(4,2)D (HNNCOCA)CBCANHN Scaling factors(κ): CB= 0.16; CA= 0.22; N=0.96
Tilt angles: $\alpha=0^0$; $\beta=\pm 9.5^0$; $\gamma=\pm 58.9^0$; $\delta=0^0$; $\varepsilon=0^0$	(4,2)D (HNN)CO(CA)CB(CA)NHN Scaling factors(κ): CO= 0.86; CB= 0.09; N=0.51
Tilt angles: $\alpha=90^0$; $\beta=\pm 36^0$; $\gamma=\pm 80.4^0$; $\delta=0^0$; $\varepsilon=0^0$	(4,2)D (HNN)CO(CA)CBCA(N)HN Scaling factors(κ): CO= 0.99; CB= 0.10; CA=0.14
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 30^0$; $\delta=0^0$; $\varepsilon=\pm 25^0$	(4,2)D HN(N)CO(CACBCA)NNH Scaling factors(κ): HN= 0.42; CO= 0.45; N=0.79
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 41^0$; $\delta=0^0$; $\varepsilon=\pm 27^0$	(4,2)D HN(N)COCA(CBCAN)NH Scaling factors(κ): HN= 0.45; CO= 0.58; CA=0.67
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm 23^0$; $\varepsilon=\pm 29^0$ $\alpha=0^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm 45^0$; $\varepsilon=\pm 58.6^0$	(4,2)D HNN(COCACBCA)NNH 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: $\alpha=\pm 52^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm 33^0$	(4,2)D HN(NCOCACB)CANNH Scaling factors(κ): HN= 0.54; CA= 0.66; N=0.52
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=0^0$; $\delta=\pm 38^0$; $\varepsilon=\pm 33^0$	(4,2)D HNN(COCACB)CA(N)NH Scaling factors(κ): HN= 0.54; N= 0.52; CA=0.66
Tilt angles: $\alpha=90^0$; $\beta=\pm 63^0$; $\gamma=0^0$; $\delta=0^0$; $\varepsilon=\pm 41^0$	(4,2)D HN(NCOCA)CACB(N)NH Scaling factors(κ): HN= 0.66; CB= 0.67; CA=0.34
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=0^0$; $\delta=\pm 80.5^0$; $\varepsilon=\pm 66.3^0$	(4,2)D HNN(COCA)CB(CAN)NH Scaling factors(κ): HN= 0.92; N= 0.40; CB=0.07
Tilt angles: $\alpha=0^0$; $\beta=0^0$; $\gamma=\pm 59.3^0$; $\delta=\pm 27.1^0$; $\varepsilon=0^0$	(4,2)D (HN)NCO(CACBCA)NNH Scaling factors(κ): N= 0.46; CO= 0.77; N ⁱ =0.45
Tilt angles: $\alpha=90^0$; $\beta=0^0$; $\gamma=\pm 82.2^0$; $\delta=\pm 30.5^0$; $\varepsilon=0^0$	(4,2)D (HN)NCO(CACB)CA(N)NH Scaling factors(κ): N= 0.51; CO= 0.85; CA =0.12
Tilt angles: $\alpha=0^0$; $\beta=90^0$; $\gamma=\pm 84.3^0$; $\delta=\pm 30.6^0$; $\varepsilon=0^0$	(4,2)D (HN)NCO(CA)CB(CAN)NH Scaling factors(κ): N= 0.51; CO= 0.86; CB =0.09

	<p>Tilt angles: $\alpha=\pm 13^{\circ}$; $\beta=0^{\circ}$; $\gamma=0^{\circ}$; $\delta=\pm 44.3^{\circ}$; $\varepsilon=0^{\circ}$</p> <p>Tilt angles: $\alpha=0^{\circ}$; $\beta=\pm 9.5^{\circ}$; $\gamma=0^{\circ}$; $\delta=\pm 44.6^{\circ}$; $\varepsilon=0^{\circ}$</p> <p>Tilt angles: $\alpha=90^{\circ}$; $\beta=\pm 36^{\circ}$; $\gamma=0^{\circ}$; $\delta=\pm 74^{\circ}$; $\varepsilon=0^{\circ}$</p> <p>Tilt angles: $\alpha=0^{\circ}$; $\beta=0^{\circ}$; $\gamma=0^{\circ}$; $\delta=0^{\circ}$; $\varepsilon=0^{\circ}$ $\alpha=90^{\circ}$; $\beta=0^{\circ}$; $\gamma=0^{\circ}$; $\delta=0^{\circ}$; $\varepsilon=0^{\circ}$ $\alpha=0^{\circ}$; $\beta=90^{\circ}$; $\gamma=0^{\circ}$; $\delta=0^{\circ}$; $\varepsilon=0^{\circ}$ $\alpha=0^{\circ}$; $\beta=0^{\circ}$; $\gamma=90^{\circ}$; $\delta=0^{\circ}$; $\varepsilon=0^{\circ}$ $\alpha=0^{\circ}$; $\beta=0^{\circ}$; $\gamma=0^{\circ}$; $\delta=90^{\circ}$; $\varepsilon=0^{\circ}$ $\alpha=0^{\circ}$; $\beta=0^{\circ}$; $\gamma=0^{\circ}$; $\delta=0^{\circ}$; $\varepsilon=90^{\circ}$</p>	<p>(4,2)D (HN)<u>N</u>(CO)<u>CA</u>(CBCA)<u>NNH</u> Scaling factors(κ): N= 0.70; CA= 0.16; Nⁱ =0.70</p> <p>(4,2)D (HN)<u>N</u>(COCA)<u>CB</u>(CA)<u>NNH</u> Scaling factors(κ): N= 0.70; CB= 0.12; Nⁱ =0.70</p> <p>(4,2)D (HN)<u>N</u>(CO)CACB(CAN)<u>NH</u> Scaling factors(κ): N= 0.96; CB= 0.16; CA =0.22</p> <p>2D [¹⁵N, ¹H] HSQC 2D [¹³C^{α}, ¹H] Projection of 3D HNNCA 2D [¹³C^{β}, ¹H] Projection of 4D HNNCACB 2D [¹³C', ¹H] Projection of 3D HNN(CA)CO 2D [¹⁵N, ¹H] Projection of 3D HNN(CACO)N 2D [¹H, ¹H] Projection of 3D HN(NCOCA)NHN</p>
Wagner and co-workers	3D RD-HCcoNH-TOCSY²²	(4,3)D <u>HC</u>(CO)NHN-TOCSY
Markley and co-workers	<p>1. 3D HNCO²³</p> <p>Tilt angles: $\alpha=50^{\circ}$, 35°, 10°, 70°, 20°, 25°, 45°</p> <p>2. 3D HNCACB²³</p> <p>Tilt angles: $\alpha=20^{\circ}$, 10°, 30°, 40°, 50°, 60°, 70°</p> <p>3. 3D CBCA(CO)NHN²³</p> <p>Tilt angles: $\alpha=50^{\circ}$, 55°, 40°, 70°, 30°, 65°, 20°</p>	<p>1. (3,2)D HNN<u>CO</u>⁶</p> <p>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</p> <p>2. (3,2)D HNN<u>CACB</u>⁶</p> <p>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</p> <p>3. (3,2)D <u>CBCA</u>(CO)<u>NHN</u>⁶</p> <p>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</p>
Wider and co-workers	<p>Projected [¹H, ¹⁵N]-HMQC-[¹H, ¹H]-NOESY²⁴</p> <p>Tilt angles: α</p> <p>Tilt angles: $\alpha=0^{\circ}$</p> <p>Tilt angles: $\alpha=90^{\circ}$</p> <p>Tilt angles: $\alpha=\pm 21.8^{\circ}$</p>	<p>(3,2)D [<u>¹H, ¹⁵N</u>]-HMQC-[¹H, ¹H]-NOESY</p> <p>Scaling factors(κ): N = $\cos\alpha$; H = $\sin\alpha$</p> <p>2D [¹H, ¹⁵N]-HMQC</p> <p>2D ¹⁵N-filtered [¹H, ¹H]-NOESY</p> <p>Scaling factors(κ): N=0.93; H=0.37</p>

Billeter and Co-workers	5D HBHACBCACONH and 5D HBHACBCANCONH ²⁵							A set of (3,2)D and (4,2)D GFT experiments
	Tilt angles: 0, 90, $\pm 45^\circ$							Scaling factors (κ)= 1 for all GFT experiments
N	C'	C α/β	H α/β	C α	C β	H α	H β	
(i - 1)	(i - 1)	(i - 1)	(i - 1)					
+								2D N15-HSQC
+	+/-							(3,2)D <u>HNCO</u>
+	+/-	+/-						(4,2)D (HBHA) <u>CBCACONH</u>
+		+/-						(3,2)D (HBHA) <u>CBCA(CO)NH</u>
+	+/-		+/-					(4,2)D <u>HBHA(CBCA)CONH</u>
+	+/-			+/-				(4,2)D (HBHACB) <u>CA(N)CONH</u>
+	+/-					+/-		(4,2)D (HBHA) <u>CB(CAN)CONH</u>
+				+/-				(3,2)D (HBHACB) <u>CA(NCO)NH</u>
+						+/-		(3,2)D (HBHA) <u>CB(CANCO)NH</u>
+	+/-					+/-		(4,2)D (HB) <u>HA(CBCAN)CONH</u>
+	+/-						+/-	(4,2)D <u>HB(HACBCAN)CONH</u>
+						+/-		(3,2)D (HB) <u>HA(CBCANCO)NH</u>
+							+/-	(3,2)D <u>HB(HACBCANCO)NH</u>
	+					+/-		(3,2)D (HB) <u>HA(CBCAN)CO(N)H</u>
	+						+/-	(3,2)D <u>HB(HACBCAN)CO(N)H</u>
	+			+/-				(3,2)D (HBHACB) <u>CA(N)CO(N)H</u>
	+					+/-		(3,2)D (HBHA) <u>CB(CAN)CO(N)H</u>

References

1. Brutscher B, Cordier F, Simorre JP, Caffrey M, Marion D. *J. Biomol. NMR* 1995; **5**: 202-206.
2. Shen Y, Atreya HS, Liu G, Szyperski T. *J. Am. Chem. Soc.* 2005; **127**: 9085-9099.
3. Kozminski W, Zhukov I. *J. Biomol. NMR* 2003; **26**: 157-166.
4. Kozminski W, Zhukov I. *J. Magn. Reson.* 2004; **171**: 186-191.
5. Kozminski W, Zhukov I. *J. Magn. Reson.* 2004; **171**: 338-344.
6. Xia YL, Zhu G, Veeraraghavan S, Gao XL. *J. Biomol. NMR* 2004; **29**: 467-476.
7. Bersch B, Rossy E, Coves J, Brutscher B. *J. Biomol. NMR* 2003; **27**: 57-67.
8. Atreya HS, Szyperski T. *Proc. Natl. Acad. Sci. U.S.A.* 2004; **101**: 9642-9647.
9. Kupce E, Freeman R. *J. Biomol. NMR* 2003; **27**: 383-387.
10. Kupce E, Freeman R. *J. Am. Chem. Soc.* 2003; **125**: 13958-13959.
11. Kupce E, Freeman R. *J. Am. Chem. Soc.* 2004; **126**: 6429-6440.
12. Kupce E, Freeman R. *J. Magn. Reson.* 2005; **172**: 329-332.
13. Kupce E, Freeman R. *J. Am. Chem. Soc.* 2006; **128**: 6420-6021.
14. Coggins BE, Venters RA, Zhou P. *J. Am. Chem. Soc.* 2004; **126**: 1000-1001.
15. Kim S, Szyperski T. *J. Am. Chem. Soc.* 2003; **125**: 1385-1393.
16. Venters RA, Coggins BE, Kojetin D, Cavanagh J, Zhou P. *J. Am. Chem. Soc.* 2005; **127**: 8785-8795.
17. Coggins BE, Venters RA, Zhou P. *J. Am. Chem. Soc.* 2005; **127**: 11562-11563.
18. Jiang L, Coggins BE, Zhou P. *J. Magn. Reson.* 2005; **175**: 170-176.
19. Hiller S, Fiorito F, Wüthrich K, Wider G. *Proc. Natl. Acad. Sci. U.S.A.* 2005; **102**: 10876-10881.
20. Fiorito, F, Hiller, S, Wider, G, Wüthrich, K. *J. Biomol. NMR.* 2006; **35**: 27-37.
21. Hiller S, Wasmer C, Gerhard W, Wüthrich K. *J. Am. Chem. Soc.* 2007; **129**: 1769-1781.
22. Sun ZYJ, Hyberts SG, Rovnyak D, Park S, Stern AS, Hoch JC, Wagner G. *J. Biomol. NMR.* 2005; **32**: 55-60.
23. Eghbalnia HR, Bahrami A, Tonelli M, Hallenga K, Markley JL. *J. Am. Chem. Soc.* 2005; **127**: 12528-12536.
24. Galius V, Leontiou C, Richmond T, Wider G. *J. Biomol. NMR.* 2008; **40**: 175-81.
25. Staykova K, Fredriksson J, Bermel W, Billeter M, *J. Biomol. NMR.* 2008; **42**: 87-97.