Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 13.8033 K, the triple point of spin-equilibrated hydrogen on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
BNM	1886904	0.001 304 310	2.08
IMGC	1857277	0.001 191 521	0.16
NIST	1774095	0.001 348 515	0.17
NPL	213865	0.001 236 821	0.21
NRC	1872174	0.001 239 948	0.23

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
BNM	1041	0.001 251 264	2.08
IMGC	1860951	0.001 215 793	0.16
NIST	1774092	0.001 165 881	0.17
NPL	1728839	0.001 351 002	0.18
NRC	1872174	0.001 240 055	0.23
PTB	1842379	0.001 186 724	0.22

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 13.8033 K, the triple point of spin-equilibrated hydrogen on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩

Group A	s/n	D_i (mK)	U_i (mK)
BNM	1886904	-2.71	4.16
IMGC	1857277	-0.32	0.32
NIST	1774095	0.42	0.34
NPL	213865	0.07	0.42
NRC	1872174	-0.26	0.46

Lab j ⇨

BNM	IMGC	NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-2.39 ± 4.17	-3.13 ± 4.17	-2.78 ± 4.18	-2.45 ± 4.19
2.39 ± 4.17	-	-0.74 ± 0.47	-0.39 ± 0.53	-0.06 ± 0.56
3.13 ± 4.17	0.74 ± 0.47	-	0.35 ± 0.54	0.68 ± 0.57
2.78 ± 4.18	0.39 ± 0.53	-0.35 ± 0.54	-	0.33 ± 0.62
2.45 ± 4.19	0.06 ± 0.56	-0.68 ± 0.57	-0.33 ± 0.62	-

Lab i ⇩

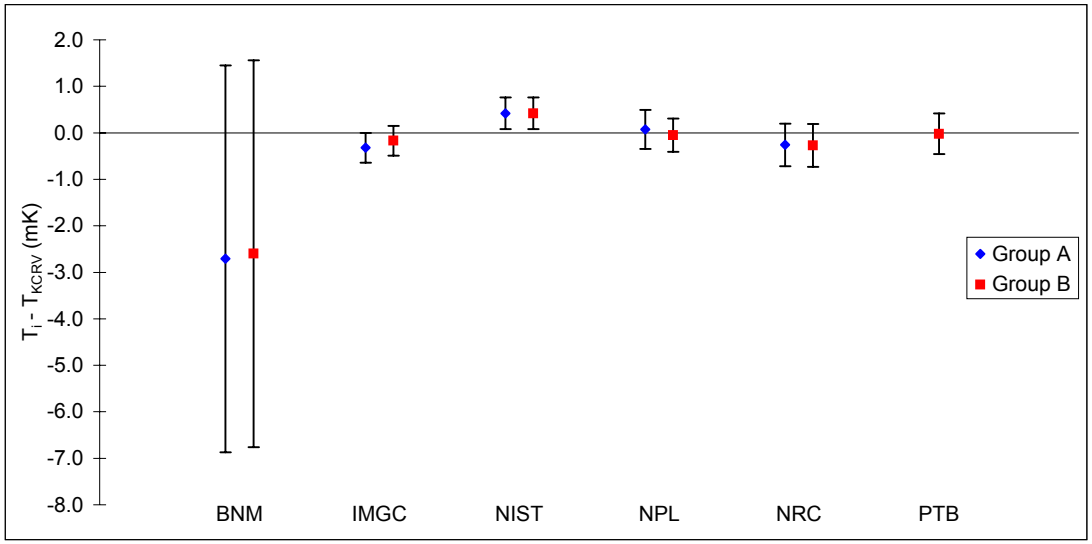
Group B	s/n	D_i (mK)	U_i (mK)
BNM	1041	-2.60	4.16
IMGC	1860951	-0.17	0.32
NIST	1774092	0.42	0.34
NPL	1728839	-0.05	0.36
NRC	1872174	-0.27	0.46
PTB	1842379	-0.02	0.44

Lab j ⇨

BNM	IMGC	NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-2.43 ± 4.17	-3.02 ± 4.17	-2.55 ± 4.18	-2.33 ± 4.19	-2.58 ± 4.18
2.43 ± 4.17	-	-0.59 ± 0.47	-0.12 ± 0.48	0.10 ± 0.56	-0.15 ± 0.54
3.02 ± 4.17	0.59 ± 0.47	-	0.47 ± 0.50	0.69 ± 0.57	0.44 ± 0.56
2.55 ± 4.18	0.12 ± 0.48	-0.47 ± 0.50	-	0.22 ± 0.58	-0.03 ± 0.57
2.33 ± 4.19	-0.10 ± 0.56	-0.69 ± 0.57	-0.22 ± 0.58	-	-0.25 ± 0.64
2.58 ± 4.18	0.15 ± 0.54	-0.44 ± 0.56	0.03 ± 0.57	0.25 ± 0.64	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 13.8033 K, the triple point of spin-equilibrated hydrogen on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand:	Resistance Ratio, W, at Nominal Temperature
Nominal Temperature:	Near 17.035 K, a defining fixed point on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
NIST	1774095	0.002 465 229	0.15
NPL	213865	0.002 347 708	0.25
NRC	1872174	0.002 351 472	0.23

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
NIST	1774092	0.002 272 922	0.15
NPL	1728839	0.002 469 357	0.23
NRC	1872174	0.002 351 418	0.23
PTB	1842379	0.002 294 680	0.30

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 17.035 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩

Group A	s/n	D_i (mK)	U_i (mK)
NIST	1774095	-0.01	0.30
NPL	213865	0.06	0.50
NRC	1872174	0.05	0.46

Lab j ⇨

NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-0.07 ± 0.58	-0.06 ± 0.55
0.07 ± 0.58	-	0.01 ± 0.68
0.06 ± 0.55	-0.01 ± 0.68	-

Lab i ⇩

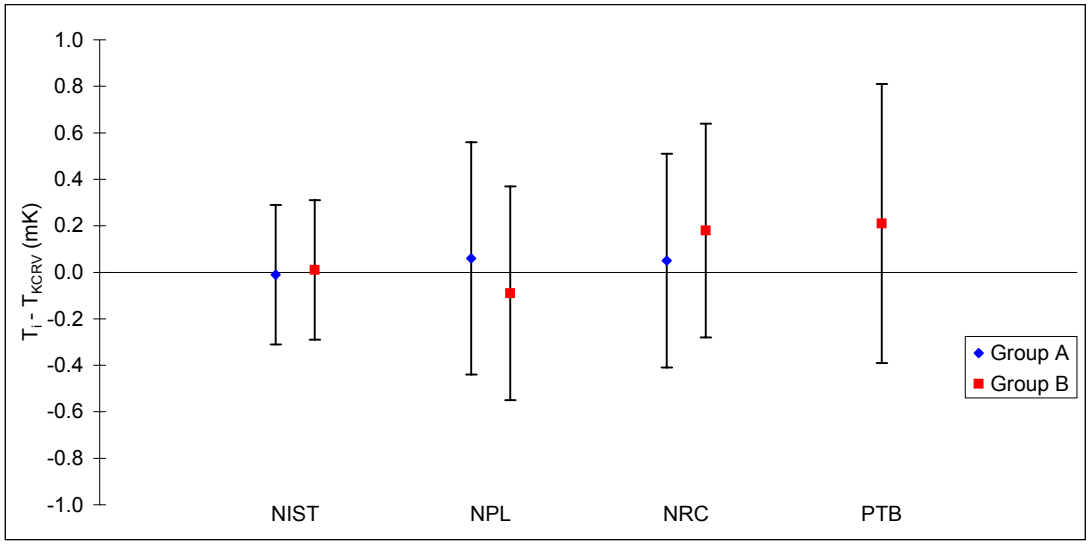
Group B	s/n	D_i (mK)	U_i (mK)
NIST	1774092	0.01	0.30
NPL	1728839	-0.09	0.46
NRC	1872174	0.18	0.46
PTB	1842379	0.21	0.60

Lab j ⇨

NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	0.10 ± 0.55	-0.17 ± 0.55	-0.20 ± 0.67
-0.10 ± 0.55	-	-0.27 ± 0.65	-0.30 ± 0.76
0.17 ± 0.55	0.27 ± 0.65	-	-0.03 ± 0.76
0.20 ± 0.67	0.30 ± 0.76	0.03 ± 0.76	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 17.035 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 20.3 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
NIST	1774095	0.004 412 085	0.14
NPL	213865	0.004 290 209	0.25
NRC	1872174	0.004 295 846	0.23

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
NIST	1774092	0.004 214 789	0.14
NPL	1728839	0.004 419 156	0.23
NRC	1872174	0.004 295 849	0.23
PTB	1842379	0.004 236 895	0.30

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 20.3 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩

Group A	s/n	D_i (mK)	U_i (mK)
NIST	1774095	0.00	0.28
NPL	213865	-0.06	0.50
NRC	1872174	0.06	0.46

Lab j ⇨

NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	0.06 ± 0.57	-0.06 ± 0.54
-0.06 ± 0.57	-	-0.12 ± 0.68
0.06 ± 0.54	0.12 ± 0.68	-

Lab i ⇩

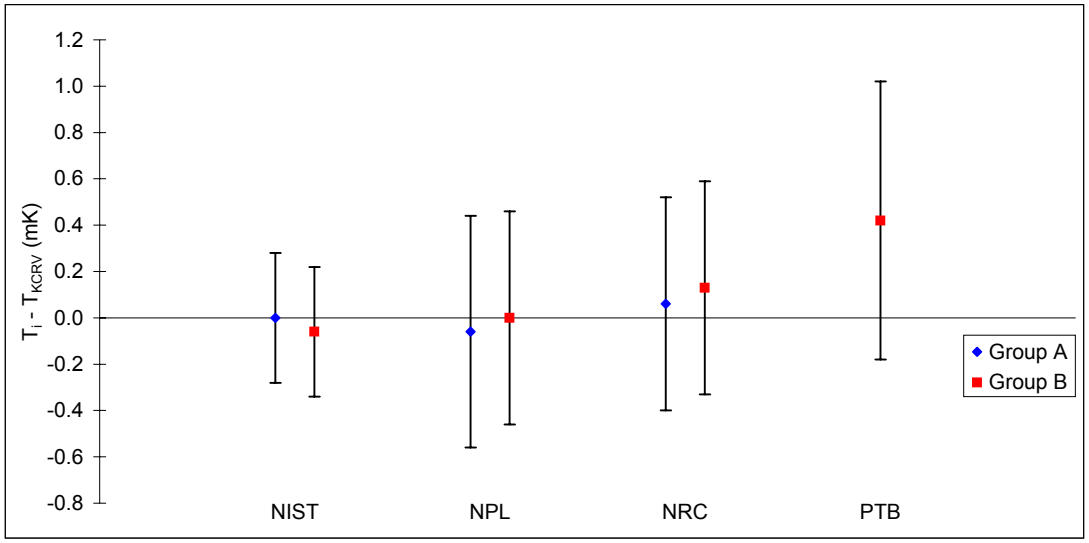
Group B	s/n	D_i (mK)	U_i (mK)
NIST	1774092	-0.06	0.28
NPL	1728839	0.00	0.46
NRC	1872174	0.13	0.46
PTB	1842379	0.42	0.60

Lab j ⇨

NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-0.06 ± 0.54	-0.19 ± 0.54	-0.48 ± 0.66
0.06 ± 0.54	-	-0.13 ± 0.65	-0.42 ± 0.76
0.19 ± 0.54	0.13 ± 0.65	-	-0.29 ± 0.76
0.48 ± 0.66	0.42 ± 0.76	0.29 ± 0.76	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 20.3 K, a defining fixed point
on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 24.5561 K, the triple point of neon
on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
BNM	1886904	0.008 581 302	0.54
IMGC	1857277	0.008 495 871	0.14
KRISS	1886906	0.008 523 028	0.20
NIST	1774095	0.008 633 474	0.16
NPL	213865	0.008 507 130	0.22
NRC	1872174	0.008 516 257	0.22

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
BNM	1041	0.008 524 861	1.40
IMGC	1860951	0.008 500 855	0.14
KRISS	1043	0.008 511 365	0.20
NIST	1774092	0.008 430 085	0.16
NPL	1728839	0.008 452 413	0.19
NRC	1872174	0.008 513 109	0.22
PTB	1842379	0.008 452 413	0.20

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 24.5561 K, the triple point of neon on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩ Group A	s/n	D_i (mK)	U_i (mK)
BNM	1886904	-0.02	1.08
IMGC	1857277	0.11	0.28
KRISS	1886906	0.01	0.40
NIST	1774095	-0.13	0.32
NPL	213865	-0.10	0.44
NRC	1872174	-0.06	0.44

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-0.13 ± 1.12	-0.03 ± 1.15	0.11 ± 1.13	0.08 ± 1.17	0.04 ± 1.17
0.13 ± 1.12	-	0.10 ± 0.49	0.24 ± 0.43	0.21 ± 0.52	0.17 ± 0.52
0.03 ± 1.15	-0.10 ± 0.49	-	0.14 ± 0.51	0.11 ± 0.59	0.07 ± 0.59
-0.11 ± 1.13	-0.24 ± 0.43	-0.14 ± 0.51	-	-0.03 ± 0.54	-0.07 ± 0.54
-0.08 ± 1.17	-0.21 ± 0.52	-0.11 ± 0.59	0.03 ± 0.54	-	-0.04 ± 0.62
-0.04 ± 1.17	-0.17 ± 0.52	-0.07 ± 0.59	0.07 ± 0.54	0.04 ± 0.62	-

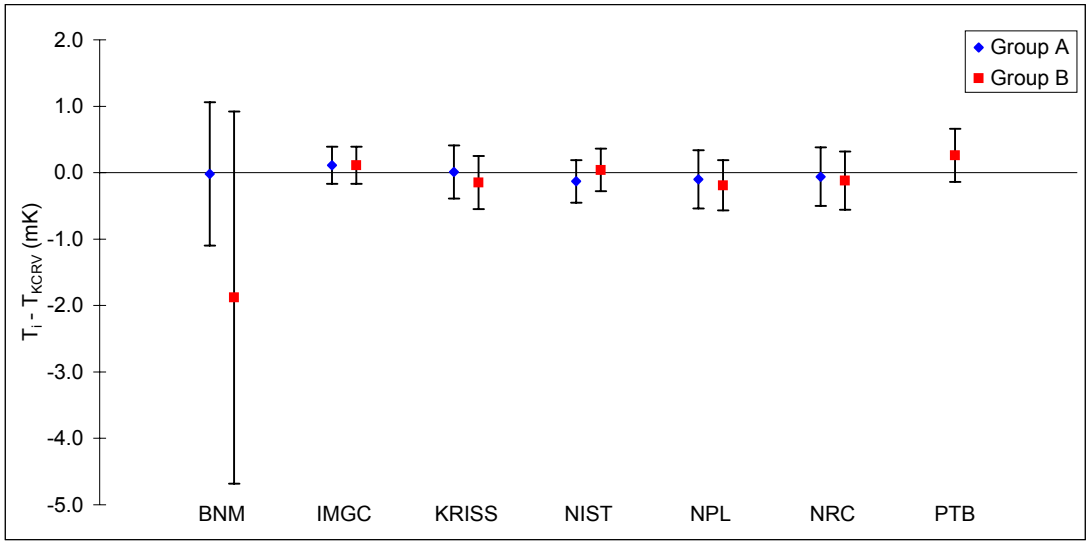
Lab i ⇩ Group B	s/n	D_i (mK)	U_i (mK)
BNM	1041	-1.88	2.80
IMGC	1860951	0.11	0.28
KRISS	1043	-0.15	0.40
NIST	1774092	0.04	0.32
NPL	1728839	-0.19	0.38
NRC	1872174	-0.12	0.44
PTB	1842379	0.26	0.40

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-1.99 ± 2.81	-1.73 ± 2.83	-1.92 ± 2.82	-1.69 ± 2.83	-1.76 ± 2.83	-2.14 ± 2.83
1.99 ± 2.81	-	0.26 ± 0.49	0.07 ± 0.43	0.30 ± 0.47	0.23 ± 0.52	-0.15 ± 0.49
1.73 ± 2.83	-0.26 ± 0.49	-	-0.19 ± 0.51	0.04 ± 0.55	-0.03 ± 0.59	-0.41 ± 0.57
1.92 ± 2.82	-0.07 ± 0.43	0.19 ± 0.51	-	0.23 ± 0.50	0.16 ± 0.54	-0.22 ± 0.51
1.69 ± 2.83	-0.30 ± 0.47	-0.04 ± 0.55	-0.23 ± 0.50	-	-0.07 ± 0.58	-0.45 ± 0.55
1.76 ± 2.83	-0.23 ± 0.52	0.03 ± 0.59	-0.16 ± 0.54	0.07 ± 0.58	-	-0.38 ± 0.59
2.14 ± 2.83	0.15 ± 0.49	0.41 ± 0.57	0.22 ± 0.51	0.45 ± 0.55	0.38 ± 0.59	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 24.5561 K, the triple point of neon
on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 54.3584 K, the triple point of oxygen on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
BNM	1886904	0.091 851 621	0.26
IMGC	1857277	0.091 842 149	0.12
KRISS	1886906	0.091 817 050	0.17
NIST	1774095	0.091 915 678	0.10
NPL	213865	0.091 777 789	0.18
NRC	1872174	0.091 805 325	0.22

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
BNM	1041	0.091 816 645	0.25
IMGC	1860951	0.091 813 149	0.12
KRISS	1043	0.091 805 357	0.17
NIST	1774092	0.091 730 552	0.12
NPL	1728839	0.091 747 843	0.15
NRC	1872174	0.091 810 015	0.22
PTB	1842379	0.091 747 843	0.23

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 54.3584 K, the triple point of oxygen on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩ Group A	s/n	D_i (mK)	U_i (mK)
BNM	1886904	-0.07	0.52
IMGC	1857277	-0.20	0.24
KRISS	1886906	0.09	0.34
NIST	1774095	0.07	0.20
NPL	213865	0.02	0.36
NRC	1872174	0.18	0.44

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	0.13 ± 0.57	-0.16 ± 0.62	-0.14 ± 0.56	-0.09 ± 0.63	-0.25 ± 0.68
-0.13 ± 0.57	-	-0.29 ± 0.42	-0.27 ± 0.31	-0.22 ± 0.43	-0.38 ± 0.50
0.16 ± 0.62	0.29 ± 0.42	-	0.02 ± 0.39	0.07 ± 0.50	-0.09 ± 0.56
0.14 ± 0.56	0.27 ± 0.31	-0.02 ± 0.39	-	0.05 ± 0.41	-0.11 ± 0.48
0.09 ± 0.63	0.22 ± 0.43	-0.07 ± 0.50	-0.05 ± 0.41	-	-0.16 ± 0.57
0.25 ± 0.68	0.38 ± 0.50	0.09 ± 0.56	0.11 ± 0.48	0.16 ± 0.57	-

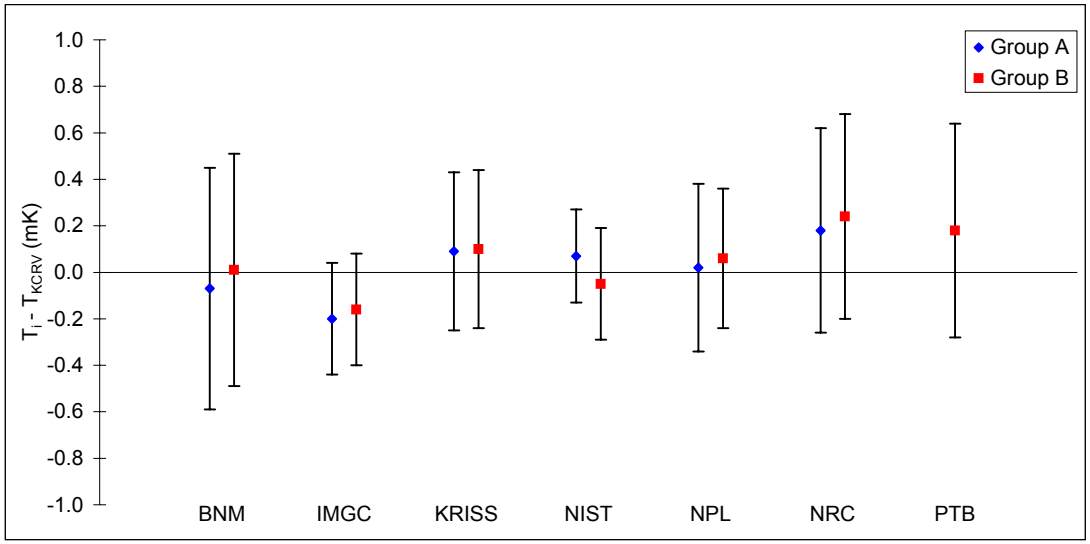
Lab i ⇩ Group B	s/n	D_i (mK)	U_i (mK)
BNM	1041	0.01	0.50
IMGC	1860951	-0.16	0.24
KRISS	1043	0.10	0.34
NIST	1774092	-0.05	0.24
NPL	1728839	0.06	0.30
NRC	1872174	0.24	0.44
PTB	1842379	0.18	0.46

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	0.17 ± 0.55	-0.09 ± 0.60	0.06 ± 0.55	-0.05 ± 0.58	-0.23 ± 0.67	-0.17 ± 0.68
-0.17 ± 0.55	-	-0.26 ± 0.42	-0.11 ± 0.34	-0.22 ± 0.38	-0.40 ± 0.50	-0.34 ± 0.52
0.09 ± 0.60	0.26 ± 0.42	-	0.15 ± 0.42	0.04 ± 0.45	-0.14 ± 0.56	-0.08 ± 0.57
-0.06 ± 0.55	0.11 ± 0.34	-0.15 ± 0.42	-	-0.11 ± 0.38	-0.29 ± 0.50	-0.23 ± 0.52
0.05 ± 0.58	0.22 ± 0.38	-0.04 ± 0.45	0.11 ± 0.38	-	-0.18 ± 0.53	-0.12 ± 0.55
0.23 ± 0.67	0.40 ± 0.50	0.14 ± 0.56	0.29 ± 0.50	0.18 ± 0.53	-	0.06 ± 0.64
0.17 ± 0.68	0.34 ± 0.52	0.08 ± 0.57	0.23 ± 0.52	0.12 ± 0.55	-0.06 ± 0.64	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 54.3584 K, the triple point of oxygen on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 83.8058 K, the triple point of argon
on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
BNM	1886904	0.215 972 101	0.20
IMGC	1857277	0.215 981 409	0.10
KRISS	1886906	0.215 949 212	0.17
NIST	1774095	0.216 038 028	0.10
NPL	213865	0.215 911 188	0.17
NRC	1872174	0.215 941 946	0.22

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
BNM	1041	0.215 944 081	0.22
IMGC	1860951	0.215 944 525	0.10
KRISS	1043	0.215 937 371	0.17
NIST	1774092	0.215 876 593	0.11
NPL	1728839	0.215 886 386	0.13
NRC	1872174	0.215 944 613	0.22
PTB	1842379	0.215 886 386	0.21

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 83.8058 K, the triple point of argon on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩ Group A	s/n	D_i (mK)	U_i (mK)
BNM	1886904	0.07	0.40
IMGC	1857277	-0.20	0.20
KRISS	1886906	0.55	0.34
NIST	1774095	0.00	0.20
NPL	213865	-0.03	0.34
NRC	1872174	0.18	0.44

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	0.27 ± 0.45	-0.48 ± 0.52	0.07 ± 0.45	0.10 ± 0.52	-0.11 ± 0.59
-0.27 ± 0.45	-	-0.75 ± 0.39	-0.20 ± 0.28	-0.17 ± 0.39	-0.38 ± 0.48
0.48 ± 0.52	0.75 ± 0.39	-	0.55 ± 0.39	0.58 ± 0.48	0.37 ± 0.56
-0.07 ± 0.45	0.20 ± 0.28	-0.55 ± 0.39	-	0.03 ± 0.39	-0.18 ± 0.48
-0.10 ± 0.52	0.17 ± 0.39	-0.58 ± 0.48	-0.03 ± 0.39	-	-0.21 ± 0.56
0.11 ± 0.59	0.38 ± 0.48	-0.37 ± 0.56	0.18 ± 0.48	0.21 ± 0.56	-

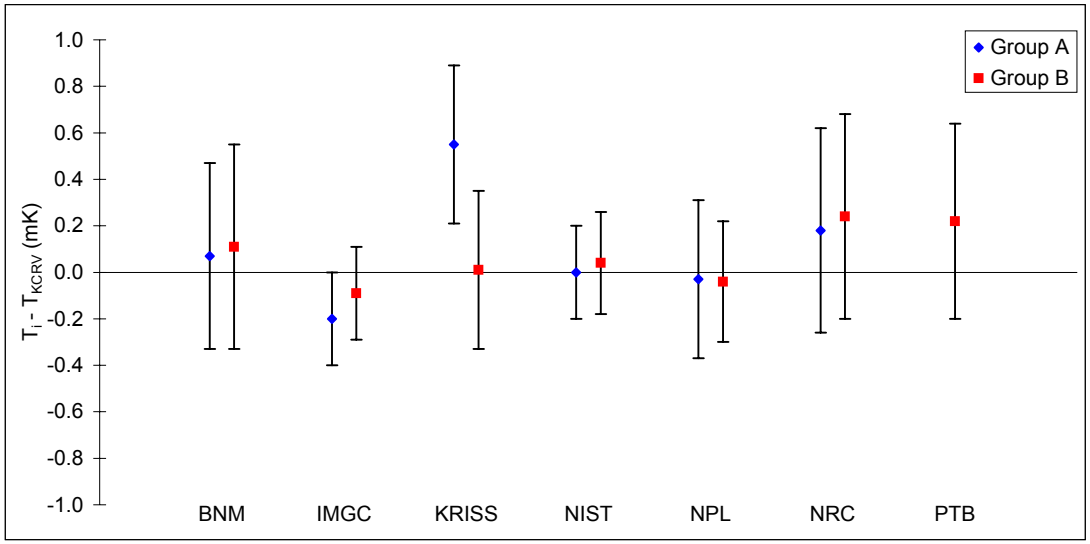
Lab i ⇩ Group B	s/n	D_i (mK)	U_i (mK)
BNM	1041	0.11	0.44
IMGC	1860951	-0.09	0.20
KRISS	1043	0.01	0.34
NIST	1774092	0.04	0.22
NPL	1728839	-0.04	0.26
NRC	1872174	0.24	0.44
PTB	1842379	0.22	0.42

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	0.20 ± 0.48	0.10 ± 0.56	0.07 ± 0.49	0.15 ± 0.51	-0.13 ± 0.62	-0.11 ± 0.61
-0.20 ± 0.48	-	-0.10 ± 0.39	-0.13 ± 0.30	-0.05 ± 0.33	-0.33 ± 0.48	-0.31 ± 0.47
-0.10 ± 0.56	0.10 ± 0.39	-	-0.03 ± 0.40	0.05 ± 0.43	-0.23 ± 0.56	-0.21 ± 0.54
-0.07 ± 0.49	0.13 ± 0.30	0.03 ± 0.40	-	0.08 ± 0.34	-0.20 ± 0.49	-0.18 ± 0.47
-0.15 ± 0.51	0.05 ± 0.33	-0.05 ± 0.43	-0.08 ± 0.34	-	-0.28 ± 0.51	-0.26 ± 0.49
0.13 ± 0.62	0.33 ± 0.48	0.23 ± 0.56	0.20 ± 0.49	0.28 ± 0.51	-	0.02 ± 0.61
0.11 ± 0.61	0.31 ± 0.47	0.21 ± 0.54	0.18 ± 0.47	0.26 ± 0.49	-0.02 ± 0.61	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 83.8058 K, the triple point of argon
on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 234.3156 K, the triple point of mercury on the International Temperature Scale of 1990 (ITS-90)

W_i: dimensionless resistance ratio of thermometer from laboratory i
s/n: serial number of thermometer from laboratory i
u_i: combined standard uncertainty of measurement made using thermometer from laboratory i.

Lab i Group A	CSPRT s/n	W_i	u_i (mK)
BNM	1886904	0.844 163 638	0.28
IMGC	1857277	0.844 167 763	0.10
KRISS	1886906	0.844 159 979	0.26
NIST	1774095	0.844 180 202	0.14
NPL	213865	0.844 152 407	0.19
NRC	1872174	0.844 160 883	0.22

Lab i Group B	CSPRT s/n	W_i	u_i (mK)
BNM	1041	0.844 157 926	0.28
IMGC	1860951	0.844 158 353	0.10
KRISS	1043	0.844 157 290	0.26
NIST	1774092	0.844 146 607	0.12
NPL	1728839	0.844 146 812	0.17
NRC	1872174	0.844 160 907	0.22
PTB	1842379	0.844 146 812	0.19

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Measurand: Resistance Ratio, W, at Nominal Temperature
Nominal Temperature: Near 234.3156 K, the triple point of mercury on the International Temperature Scale of 1990 (ITS-90)

Key comparison reference value: there is no single reference value for this comparison.
Measurements were performed in two separate Groups (Group A and Group B).
Resistance ratios are used with calibration equations for each thermometer to obtain temperature.
The KCRV reference temperature is the weighted average temperature calculated using the experimental variances to set the weights.
The KCRV reference temperatures for this comparison have zero uncertainty by definition.
The two measurement runs (Group A and Group B) are evaluated separately.

The degree of equivalence of each laboratory with respect to the reference value is given by a pair of numbers:
$D_i = (T_i - KCRV)$ and U_i, its expanded uncertainty (at 95% confidence level), both expressed in mK.

The degree of equivalence between two laboratories is given by a pair of numbers:
$D_{ij} = D_i - D_j = (T_i - KCRV) - (T_j - KCRV)$ and U_{ij}, its expanded uncertainty (*95%*), both expressed in mK.

Lab i ⇩

Group A	s/n	D_i (mK)	U_i (mK)
BNM	1886904	-0.23	0.56
IMGC	1857277	-0.06	0.20
KRISS	1886906	-0.12	0.52
NIST	1774095	0.12	0.28
NPL	213865	0.11	0.38
NRC	1872174	-0.14	0.44

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-0.17 ± 0.59	-0.11 ± 0.76	-0.35 ± 0.63	-0.34 ± 0.68	-0.09 ± 0.71
0.17 ± 0.59	-	0.06 ± 0.56	-0.18 ± 0.34	-0.17 ± 0.43	0.08 ± 0.48
0.11 ± 0.76	-0.06 ± 0.56	-	-0.24 ± 0.59	-0.23 ± 0.64	0.02 ± 0.68
0.35 ± 0.63	0.18 ± 0.34	0.24 ± 0.59	-	0.01 ± 0.47	0.26 ± 0.52
0.34 ± 0.68	0.17 ± 0.43	0.23 ± 0.64	-0.01 ± 0.47	-	0.25 ± 0.58
0.09 ± 0.71	-0.08 ± 0.48	-0.02 ± 0.68	-0.26 ± 0.52	-0.25 ± 0.58	-

Lab i ⇩

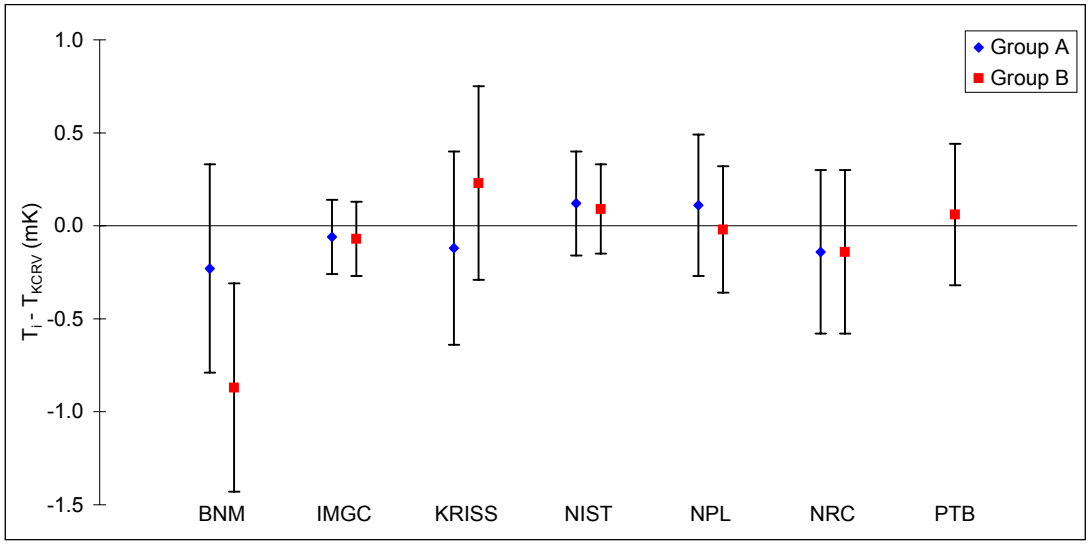
Group B	s/n	D_i (mK)	U_i (mK)
BNM	1041	-0.87	0.56
IMGC	1860951	-0.07	0.20
KRISS	1043	0.23	0.52
NIST	1774092	0.09	0.24
NPL	1728839	-0.02	0.34
NRC	1872174	-0.14	0.44
PTB	1842379	0.06	0.38

Lab j ⇨

BNM	IMGC	KRISS	NIST	NPL	NRC	PTB
$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK	$D_{ij} \pm U_{ij}$ mK
-	-0.80 ± 0.59	-1.10 ± 0.76	-0.96 ± 0.61	-0.85 ± 0.66	-0.73 ± 0.71	-0.93 ± 0.68
0.80 ± 0.59	-	-0.30 ± 0.56	-0.16 ± 0.31	-0.05 ± 0.39	0.07 ± 0.48	-0.13 ± 0.43
1.10 ± 0.76	0.30 ± 0.56	-	0.14 ± 0.57	0.25 ± 0.62	0.37 ± 0.68	0.17 ± 0.64
0.96 ± 0.61	0.16 ± 0.31	-0.14 ± 0.57	-	0.11 ± 0.42	0.23 ± 0.50	0.03 ± 0.45
0.85 ± 0.66	0.05 ± 0.39	-0.25 ± 0.62	-0.11 ± 0.42	-	0.12 ± 0.56	-0.08 ± 0.51
0.73 ± 0.71	-0.07 ± 0.48	-0.37 ± 0.68	-0.23 ± 0.50	-0.12 ± 0.56	-	-0.20 ± 0.58
0.93 ± 0.68	0.13 ± 0.43	-0.17 ± 0.64	-0.03 ± 0.45	0.08 ± 0.51	0.20 ± 0.58	-

Key Comparison CCT-K2
Comparison of Capsule Style Standard Platinum Resistance Thermometers

Degrees of Equivalence: Laboratory Deviations from KCRV reference temperature (mK)
Nominal Temperature: Near 234.3156 K, the triple point of mercury
on the International Temperature Scale of 1990 (ITS-90)



The Group A and Group B thermometers have been analyzed separately.
The error bars are at the 95% confidence level, and include both calibration and experimental uncertainty components.
The KCRV reference temperature has been calculated as a weighted average of the temperatures indicated on the calibrated capsule thermometers. For details, please refer to the CCT-K2 Key Comparison Report.
The KCRV reference temperature has zero uncertainty by definition.