Resistivity and Susceptibility
Tests to May 23, 1988

DATE	SAMPLE	TYPE OF TEST	FILE NAME	INPUT BY CHANNEL	NOTES
11/11/86	NT 1140 √	susc.	NT1140	1 (Ge) 2 (lock in)	20 mV/FS 0° phase
11/11/86	NT 1119 √	susc.	NT 1119	"	10 mV/FS 0° phase
11/12/86	NT1121 √	susc.	NT1121	"	20 mV/FS 0° phase
"	NT1120 √	susc.	NT1120	"	"
12/10/86	NT1177 √	susc.	NT1177	"	10 mV/FS
12/10/86	NT1178 √	susc.	NT1178	"	20 mV/FS
12/11/86	Pb	susc.	Pb-S	"	20 mV/FS
12/11/86	√	susc.	√-S	"	10 mV/FS
12/11/87	Nb	susc.	Nb-S	"	20 mV/FS
12/12/86	NT1167 √	susc.	NT1167	"	10 mV/FS
12/12/86	NT 1191 √	susc.	NT1191	"	10 mV/FS
12/12/86	NT 1160 √	susc.	NT1160	"	10 mV/FS
12/15/86	LaSrCuO	Resist (no press.)	SR1 - (lead cured at T > 300K)	1: Ge 2: Al-chr. (ref: room T) 3: Resist	I = 2 mA FS = 2/5/10/20/5 mV (10 V)
12/15/86	LaSrCuO (R.T.)	Resist	SR2. (R.T.)	"	I = [redacted] 50 μA FS = 20/100/200/500 mV (10 V)

DATE	SAMPLE	TYPE OF TEST	FILE NAME	INPUTS By channel		NOTES
12/16/86	LaCaCuO (cured on hot plate)	Resist.	~~CA1~~ CA1	"	ref. at 0°C	I = 80 μA FS = 200 mV (something around 60 K)
12/16/86	" (cured at room T)	"	~~CA2~~ CA2	"	"	I = 80 μA (32 μA) FS = 50/200/500/-1.00 offset mV
12/16/86	"	" (<77K)	CA3	"	"	I = .8 μA (.73 μA) FS = 100 mV/200 around 5K (8 mV)
12/17/86	LaSrCuO annealed	Resist.	SR3	"	ref. at room T	I = 0.9 μA FS = 20 mV
12/12/86	LaCaCuO annealed	Resist.	CA4	"	"	I = 2 mA Manual
12/18/86	$La_3Ba_3Cu_6O_{14}$ from Houston 1st piece	Resist.	~~BA1~~	"	"	I = 68.5 μA Phase is bad Manual
"	"	"	not saved	"	ref. at 0°C	I = 80 μA
"	"	DC Resist.	~~BA2~~	"	"	I = 100 μA
"	" 2nd piece	AC Resist.	~~BA3~~			~~I = 80 μA~~ I = 0.66 mA / Current decreases to 243 mA at Low T
12/19/86	LaSrCuO new batch annealed 1st (annealed at 500°C 5 hrs)	"	SR3	"	"	I = 98 μA "
"	"	"	SR4	"		I = 95.8 μA (I = 94.9 μA)
12/20/86	LaSrCuO new batch annealed #2	(lead cured on hot plate)	SR5	"		I = 93.8 μA
12/21/86	LaSrCuO annealed 2nd time (500°C 5 hrs + 900°C 20 hrs)	Lead cured on " hot plate	SR6	"		~~I = 93~~ I = 0.847 mA

12/21/86	LaSrCuO annealed 2nd time (same step 900°C 20 hrs)	lead cured on " hot plate	SR 6	"	~~I = .953~~ I = 0.847 mA
12/21/86	↙ anneal 500°C 5 hrs LaSrCuO (same as SR 3) batch #3	lead cured in RT overnight in vac.	SR 7	"	I = 0.837
12/22/86	LaBaCuO (2nd Houston batch)	AC Resist	BA4	"	I = .780 mA → .731
12/22/86	LaSr(0.33)CuO (#3 new batch) not annealed	lead cured on hot plate	Sr 8	"	I = .807
12/23/86	LaSr(.33)CuO same sample (Sr 8)	leave in air overnight	Sr 9	"	I = 0.924 → .730 mA
12/23/86	another piece	AC Resist in bomb	Sr 10	"	I = .79 → >77
"	same	"	Sr 11	"	" <77
"	"	"	Sr 12	"	cooling warming
12/23/86	"	Suscept.	Sr 13	"	cooling
"	LaSr(.33)CuO (#3 annealed)	AC Resist	Sr 14	" small probe	I = .855 mA
"	different piece from same batch. higher resistance. left in air 1 hr longer.	"	Sr 15	" "	I = .707 mA
"	LaSr(.30)CuO (#4 not annealed) #1	"	Sr 16	" "	I = .817 mA
12/24/86	LaSr(.35) CuO (#4 not annealed) ~~#3~~? #1	"	Sr 17	" "	I = .757 mA
~~12/24/86~~	~~LaSr(.33)CuO #3 (not anneal, rerun another)~~	~~R(X.Y. both) ... 2°~~ $Y_0 \sim 0.02\,\mu V$	~~Sr 18~~	~~cancel~~	~~I = .800 mA~~
12/24/86	LaSr(.33)CuO #3 not anneal rerun another sample	use gold paste for lead AC "	Sr 18	ice in dewar could not lower Temp. stop before transition one lead may be loose	I = 0.855 mA

Date	sample	Type of test	File name	Inputs By channel	Notes
12/24/86	$La_{1.67}Sr_{(0.33)}CuO_4$ #3 annealed (No. 2)	R. gold paste lead	SR 19	~~1=R~~ 1: ~~Ge-Th~~ 2. T.C. 3. Lockin X 4. Lockin Y	I = 0.897 ~~Turn on Ge. I ~ 2.5 ohm T.C.~~ (4: abs.)
12/26/86	$La_{1.67}Sr_{(.33)}CuO_4$ #4 annealed	"	Sr 20	" deionized H_2O reference	I = .869 θ = 94.6 ↳ .811
12/26/86	" not annealed	"	Sr 21	" 4. θ & Y	I = .807
"	" #3 not annealed	"	Sr 22	1 2 3	I = .833
"	" #4-1 not annealed	"	Sr 23	1-4 4: change sensitivity ~~faster~~	I = 0.854 → I = 2.754 at 5°K (warming) i.e. reading not right, in 1.4K ice
"	"	"	Sr 24	1-4 I phase shift at finish ~ [-170.6°] ~~-180°~~	I = 2.754 (at low T) (warming) I: phase 94.3° (0.796 at R.T.)
"	Same as Sr24,23	"	Sr 25 disk #4	1-4 reverse I, V. phase stat: 44.3°	I = 0.7467 (R.T.) I = 0.783 at low T (warming) entire charge I, V, leads ϕ ~ 94.2°; ~~entire T~~ 77°K ~ 5.523 mV
12/27/86	" #4-1 not annealed diff. piece (from Sr23)	"	Sr 26	1-4 phase ϕ = 94.6 (R.T.) ext ϕ = 94.3° (L.T.)	I = 0.825 (R.T.) ϕ = 94.6°
"	Rerun Sr26	"	Sr 27	" ϕ = 92.6° (R.T.) ϕ ~ 45° (L.T.)	I = 0.825
"	#4-1 not annealed another piece (same batch)	"	Sr 28	" ϕ = 97.3° (R.T.) ϕ = 167.4° (L.T.)	I = .813 (R.T.) ϕ = 94.2° ↓ .788 (L.T.) ϕ = 94.3°
in Houston 12/29/86	$La_{1.67}Sr_{(.33)}CuO_4$ #4 not annealed	Resist. in Bomb	Sr 29	1. Ge 2. TC 3. X 4. θ ϕ = 107.2° (R.T.) I (Ge th) = 30 μA ?	~~I = .706 ϕ = 94.4°~~ I = .956 ϕ = 92.1°
"	?! 37.5 Hz #3 not annealed	"	Sr 30 @ 77°K	ϕ = 92.1°	I = 1.08 mA ϕ = 91.9°
	"	"	Sr 31 77 ~ 50	3.4 K	(P = 0)

"	?? 37.5 He #3 not annealed	"	Sr 30 @ 77K	$\phi = 92.1°$	$I = 1.08$ mA $\phi = 91.9°$
	"	"	Sr 31 77 – 50	3.4 K	(P=0)
"	"	R + X	Sr 32 low T	1 – 5 34 K 5 X;	X: off sca 6.30 .05 μV FS f = 47.1 Hz offset @ 6.30 ② I → 1.07 mA $\phi = 91.5°$
					pt. 204 change offset 6.3 → 6.9 (X) 564 6.9 → 7.9 ~590 sens. → 5 μV offs. → +.8 ~606 sens. → 10 μV offs. → +.4
"	"	lead X	PB 1-W (warming)	1. TC 2. Ge 3. X Pb	sens. → 10 μV offs. → .4 warming, ~~then cooling~~
"	"	lead X	PB1-C (cooling)	"	" cooling
12/30/86	" (P=3.5 kG) #3	R >77K	Sr 33 *	1. TC 2. Ge, 3. R(X) 4 4. R(Y)	I = 0.978 $\phi = 92.1°$ [F = 3.5 kHz]
"	"	<77K	Sr 34 *	"	"
"	" (P=3.5)	lead X	PB2-C cooling (too fast)	1. TC 2. Ge 3. X	sens. → 10 μV offs. → 1.36
"	"	"	PB2-W warming	"	"
"	"	"	PB2-C2	"	"
"	#3 " (P=6)	R >77K	Sr 35	1. TC 2. Ge 3. R(X) 4. R(Y)	I = .978 $\phi = 92.1°$

〃	〃	R < 77K	Sr 36	〃	〃
〃	〃 (P=6) kIbs	Pb χ	Pb3 - W warming	1. TC 2. Ge 3. Pb χ	10μV FS +1.25 offset
〃	〃	〃	Pb3 - C cooling	〃	〃
〃	〃 (P=8 kIbs)	R T>77K	Sr 37 *	1. TC 2. Ge 3. R(X) 4. R(Y) ↳ θ = 92.1°	I = 1.04 mA φ = 92.1
〃	〃	〃 T<77K	Sr 38 *	〃	〃
〃	〃 (P=8 kIbs)	Pb χ	Pb4 - W	1. TC 2. Ge 3. χ	10μV FS +.8
〃	〃	〃	Pb4 - C	〃	〃
〃	〃 (P=10 kIbs)	R T>77K	Sr 39 *	1. TC. 2. Ge 3. R(X) 4. R(Y) θ = 91.0	I = 0.984 φ = 91.9 F = 10 kIbs
12/31/86	〃	T<77K	Sr 40 *	〃	〃
〃	〃	rerun R ~ 100K → 30K	Sr 41	〃	I = 103μA φ = 92.0
〃	〃	rerun R change I 100K-30K	Sr 42	〃	I = 10.0 mA
1/1/87 12:02 a.m.	① 〃 (F=12 kIbs) and ~~#4-1~~ (not annealed) F=0 S=47.8 Hz	R T>77K	Sr 43 *	1. TC 2. Ge 3. R ("auto") ① 4. TC ② 6. R ↳ FS = 100μV (→ 10 V)	I = 1.04 mA φ = 92.0° ~~I = 1.003~~ φ = 87.1°

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1/1/87 12:02 a.m.	① " (F=12 klbs) and ② #4-1 (not annealed) F=0 S=47.8 lbs	R T>>>K "	Sr 43 *	1. Tc 2. Ge 3. R ("auto") ① 4. Tc ③ 6. R → FS = 100 μV (→ 10 V)	I = 1.04 mA ϕ = 92.0° ϕ = 87.1°
"	"	R F>>>K	Sr 44 *	" FS = 50 μV ③ pt. 357 change to 100 μV p. 427 change back to 50 μV	I = ; ϕ = ; I = .98; ϕ = ;
"	① " (F=12 klbs) Pb χ	Pb χ	Pb 5-C	auto (V_{pp} = 10 V) direct 1. Tc 2. Ge 3. χ	
"	② " (F=0 klbs)	Pb χ	Pb 6-W	sens. = 100 μV offs. = 6.30 + X-former	
"	"	"	Pb 6-C	"	"
"	② " "	Sample χ cooling	SR45-S.ORG	sens. = 100 μV offs. = 5.42 + X-former	Last good point around 361 Ω marks lead transition.
"	① F=15	R T>>>K	SR46	1. Tc 2. Ge 3. R	I = 0.969, ϕ = 97.2
"	"	T>>>K	SR47		I = .949
"	"	Pb χ	Pb 7-C	auto 10 V pp + X-former	
"	La Sr(.2) Cu O SL-2 ③	R	Sr 48	1. Tc 2. Ge small bomb 3. R θ = 85.6 → Alun, Chr. standard	I = .88 mA ϕ = 85.0

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1/2/87	① back to 9 klbs	RT > 77K	Sr 49	1. Tc 2. Ge 3. R θ = 84.2°	I = .876 ϕ 85°
"	"	R < 77K	Sr 50	"	"
"	$La_{Sr(.20)}CuO$ SL-6 ③	R > 77K	Sr 51	1. Tc (Au/Fe) small bomb 2. Ge 3. R.	I = .98 mA
"	"	R < 77K	Sr 52	"	"
"	"	R < 77K warming	Sr 53	"	" ϕ = ?
"	90% $(La_{.9}B_{.1})CuO_4$ 10% $(La_{.9}Sr_{.1})_2(CuO_4$	R > 77 K	BaSr 1	small bomb 1. Tc 2. Ge 3. R	I = .954 ϕ = 84.9°
"	Calibration Carbon (He³ + C-C T.C.	Voltage of G·R & T.C	~~Cal. C~~ C-Cal.	ch① ~~Carbon~~ T.C. ② Carbon R	I = 10 μA DC R.T. ① .866 mV reading ② 49783 mV
			③ { X = 20 mV Fs Y = 20 mV Fs change current to 10 μA at 150 K	② { X: 20 mV Fs ← at ~ 42 mV y same ②	① { ① X: 2 mV Fs ② y = 20 mV Fs
1/7/86	$La_{1.8}Sr_{.2}CuO$ finely ground #5	R > 77K	SR54 Cooling	small probe (CC) 1. Tc 2. Ge 3. R	I = .8 mA ϕ = 84.9°
			SR55		

Cooling 2. Ge 3. R

			SR55 warming		
1/7/86	$La_{1.8}Ca_{.2}CuO$ finely ground #5	R >>>	CA5	" $\theta = 82.5°$	$I = .868$ mA $\phi = 84.9°$
1/9/86	"	R cooling	CA6	"	$I = .785$ mA $\phi = 84.8°$
"	"	R warming	CA7	"	" better phase
"	$La_{1.8}Sr_{.2}CuO$ fine ground #5 same piece	R	SR56		.839 = I 84.9° = ϕ
"	$La_{1.8}Ca_{.2}CuO$ mortar ground ~~same~~ piece different	R	CA8		.889 = I (mA) 84.8° = ϕ
1/10/86	$La_{Ca_2}Cu_O$ fine ground (#5) ~~different~~ piece.	R > 77°K	CA9	$\theta = 84.9°$	I = 0.890 (mA) $\phi = 84.9$
1/10/86	"	R < 77°K	CA10	"	"
"	$La_{1.8}Sr_{.2}CuO_4$ fine ground #5 new piece	R	SR57	$\theta = 84.9°$	$I = .893$ mA $\phi = 84.8°$
"	" mortar ground #5	R	A-SR58 ~~SR58~~ copied over	$\theta = 84.9°$	$I = .869$ $\phi = 84.8°$
1/11/86	$LaSr_{.22}CuO_p$ fine ground #5 p=0 (same piece as SR51)	R > 77°K pressure bomb	SR58 & SR59 ↓ divide by 8.9	$\theta = 85.0$	$I = .889$ $\phi = 85°$
"	"	R < 77°K	SR60	"	"

11	11	χ sample & lead	SR61	pt. 1 x-off = 4.79, y-off = 0 pt 475 y-off → -.) (auto) pt 520 x-off → 9.5 pt 530 y-off → -4.44 pt 695 x-off → 8.16	V_{p-p} = max transformer coupling
		P=0			
4	4	R (warming) P=0	SR62		I = 0.893 (low T) warming curve
1/11/87	$LaSr_{1.2}Cu_{1.9}Ga_{0.1}O_4$ Fine ground 500 Kbpress	R	SRGA1	θ = 56.2° phase off -	I = .768 84.9
11	$LaSr_{1.2}CuO$ Fine ground P=4 kilbs	R > 77°K	SR63	θ = 84.9	I = 0.893 84.9
11	11	R < 77°K	SR64	11	11
11	11	11 warming	SR65	11	11
11	11 P=4	χ (sample & lead) no lead signal	SR66	pt 200, Y offset = 0.97 pt 320, Y off. = -0.86 pt 357, Y = -1.93 pt 450, Y = -3.02 pt 500 Y = -3.99	start ϕ = 146° transformer
1/12/87	11	χ (sample & lead)	SR67	cont. take $x\left[-\cos\left(\frac{\quad}{\quad}\right)\right]$	start ϕ = 134° use conti

1/12/87	"	X (8 lead)	SR67 ✓	cont. take $x[-\cos(\text{—})]$	Start $\phi = 134°$ use cont.
"	F=?	R (all Temperature)	SR68	cont.	I = .889 $\phi = 84.5$
"	"	R (warming)	SR69	cont.	"
"	"	X (sample & lead)	SR70	cont. use 1-GDA2 program	$\phi = 135.3°$
1/12/87 quick check	$LaSr_{.2}CuO_0$ Finer ground 20hrs, #6a (500 lb)	R small probe	SR71		I=0.891 ϕ=84.4
1/13/87 quick check	$LaSr_{.33}CuO_4$ Finer ground 20hrs, #7b (1000 lb)	R small probe	SR72	ϕ = 84.4	I=0.881 ϕ=84.5
1/13/87	F=?	X	SR73		$\phi = 110°$
"	"	R warming	SR74		I=.889
"	$La_{1.8}Sr_{.2}Cu_{.9}Ag_{.1}O$ 1000 lbs.	R small probe	SR75	T_c not change much seems to be broader	.892 84.4°
"	$LaSr_{.2}Cu_{.9}Al_{.1}O$ 1000 lbs	R	SR76	Resistance rise at ~100K T_c onset lower	.843 84.0°
1/14/87	$LaSr_{.2}CuO$ Reduced P~3 kbs	R >77K	SR77	Resistance increase to 603/889 (μΩ) at R.T. about 15 x zero p value	I=0.889 ϕ=84.5

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〃	〃	R <77°K	SR 78	〃	〃
〃	〃	R <77°K warming	SR 79	〃	〃
〃	〃	X (Sample Lead)	SR 80	1-Grok	〃
1/15/87	P = 5 kLbs	R >77K	SR 81		I = .886 mA ϕ = 84.5°
〃	〃 7 kLb	R<77K	SR 82	〃	〃
〃	〃	R<77K Warming up	SR 83	〃	〃
〃	〃	X	SR84		ϕ = 138.3 Vpp = max
〃	〃	X warm up	SR 85	〃	〃
〃	LaSrCuO #8 (T.D. Wet chemical)		SR86	ϕ = 84.5	I = .890 ϕ = 84.4°
1/16/87	LaSrCuAgO 1.8 .2 .5 .5	R	SR87	〃	I = .889 mA ϕ = 84.4°
	LaSr Ag				

1/17/87	$LaSr_{1.8}$ [illegible] $_{0.5}$ .1/3					
1/17/87	$La_{1.8}Sr_{.2}Cu_{.75}Hg_{.25}O$ "	R		SR88	θ=84.5	I=0.885 mA φ=84.6°
1/17/87	$La_{1.8}Sr_{.2}Cu_{.5}Zn_{.5}O$	R		SR 89	θ=84.3 semiconductor	I=96.1 μA φ=84.4
1/18/87	La(BaCa)CuO	R	Thermocouple or Thermometer bad.	SR 90	θ=84.5	I=0.886 φ=84.4°
"	"	R		SR91		I=.890 φ=84.4
1/18/87	$La_{1.8}(Na_{.5}K_{.5})_{.2}CuO$ "	R		SR92	θ=84.5	I=0.889 φ=84.4
"	$La(Na_{.6}K_{.4})_{.2}CuO$ rerun another piece	R		SR93	"	I=.890 φ=84.4
"	" rerun SR92	R	with better contact	SR94	θ=84.4	I=.881 φ=84.4
1/19/87	$La_{1.8}(Sr_{.5}K_{.5})_{.2}CuO$	R		SR95	"	I=.888 θ=84.5
1/20/87	$La_{1.8}Sr_{.1}Ag_{.1}CuO$	R		SR96	"	I=.891 θ=84.5

"	$LaSrCuO_4$ ①/3 + La_2CuO_4 ②/3 annealed	R	SR97	"		I = .887 mA ϕ = 84.5°
"	"	"	SR98 warming	"		"
~~$La_{1.8}Sr_{.2}Cu$~~ "	$La_{1.8}Sr_{.2}CuO_4$ left in air for ~1 wk.	R	SR99	"		I = .893 mA ϕ = 84.6°
1/22/87	$La_{1.9}Sr_{1.1}Cu_2O_=$	R	SR100	θ = 84.5		I = .816 ϕ = 84.5
START USING 1-TRUE NP for small probe.						
1/23/87	$LaSr_{.2}CuO$ (#5b) (Hall meas. sample	R  1-2 → I 3-4 - V	SR101	θ = 84.8 reference too warm		I = .888 ϕ = 84.5
"	$LaSrCuO_4$ ①/3 + La_2CuO_4 ②/3 2 hrs. 1000°C together	R				I = .768 ϕ = 84.3
"	$La_{1.9}Sr_{.1}Cu_1O_3$	R	SR102			.894 = I 84.0 = ϕ
"	$La_{1.8}Sr_{.2}Cu_1O_=$	"	SR103			I = .891 ϕ = 84.4
"	$LaSrCuO_4$ 1/3 + La_2CuO_4 2/3 2 hrs. 1000°C after annealing	"	SR104			I = .890 ϕ = 84.4
1/26/87	$La_{1.9}Ag_{.1}CuO_=$	"				I = .888

after annealing

1/26/87	$La_{1.9}Ag_{.1}CuO_{=}$	"	SR105 ~~curing~~	✓	I = .888 ϕ = 84.5
"	$La_{1.85}Hg_{.15}CuO_{=}$	"	SR106 cooling + warming		I = .869 ϕ = 84.4
"	"	" Rerun	SR107		"
"	"	" Change I	SR108		I = 94.6 μA → 96.9 ϕ = 84.2°
"	"	"	SR109		I = 96.9 μA ϕ = 84.3°
1/27/87	$La_{1.75}Hg_{.25}CuO_{=}$	R	SR110		I = 96.3 μA ϕ = 84.3°
1/28/87	$La_{1.85}Hg_{.15}CuO_{=}$	R	SR111		I = 96.4 μA ϕ = 84.4°
1/28/87	$La_{1.75}Hg_{.25}CuO_{=}$	R use low T reading for thermom. calibr.	SR112		I = 93.2 MA ϕ = 84.2°
1/29/87	~~$Yb_{1.2}Ba_{.8}CuO$~~	R	~~SR113~~ YB1	T_{co} > 77°	Transl. von Spaten Notary Public 1/29/87
1/29/87	"	R	~~SR114~~ YB2	measured above LN_2	
"	$Yb_{1.2}Ba_{.8}CuO$	"	YB4		I = .892 ϕ = 84.3
"	"	R	~~SR114~~ YB3	"	

another piece of SR113

~~Repeat of SR113~~