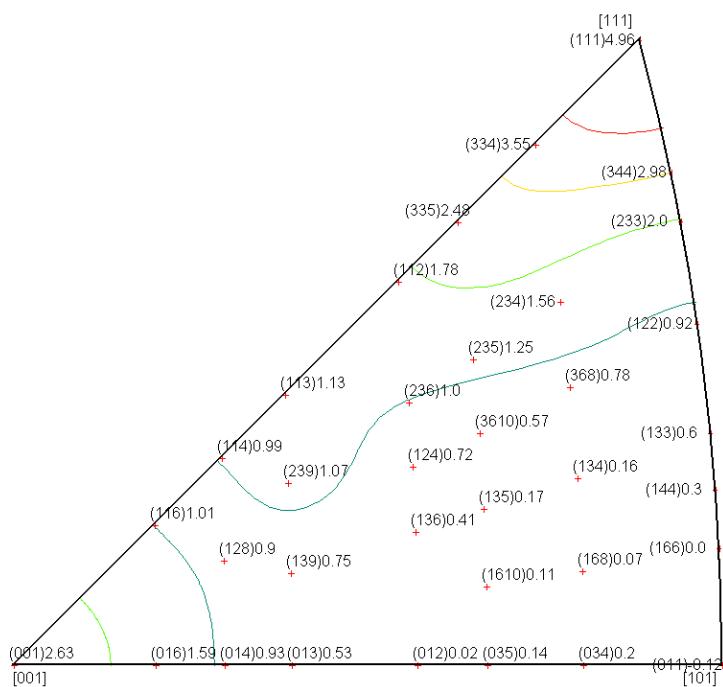


## ODF解析後の逆極点図数値化



2026年01月24日

Helper Tex Office

## 概要

複数の極点図からODF解析を行うと、ND, RD, TD方向の逆極点図が計算されるが、この逆極点図の利用は少ない。CTRソフトウェアは、逆極点図の数値化を行って利用可能にしています。逆極点図を36分割(36Box)し、そのBox内の平均方位密度の数値化である。方位はその多重性により4:2:1で計算されるが、Box平均では単純平均を行っている。計算は、

Box内の平均方位密度計算 ABBox

平均方位密度%  $ABBox = ABBox / sum * 100$  (%)

Random比率  $RBBox = ABBox / (100 / 36)$

対応ソフトウェア

InverseDisp (Ver 1.32)

InverseDisp2 (Ver 2.11)

GPIverseDisplay (Ver 1.50) +

InverseCubicContourDisplay (Ver 1.30)

対応ODF

	LaboTex		StandardODF		rigakuODF	Vector	TexTools	MTEX	popLA	結果			
	5	5->1dg	OUTPUT2	ODF16	INVERSEOUT2					Intens	Integ	Integ(%)	/Random
InverseDisp	○		○							○			
InverseDisp2	○	○	○	△		○		○		○	○	○	○
GPIverseDisplay	○	○		○	○		○	○	○	○	○	○	○

ABBox                    Integ (Inverse)

ABBox                    Integ (%) (Inverse (%))

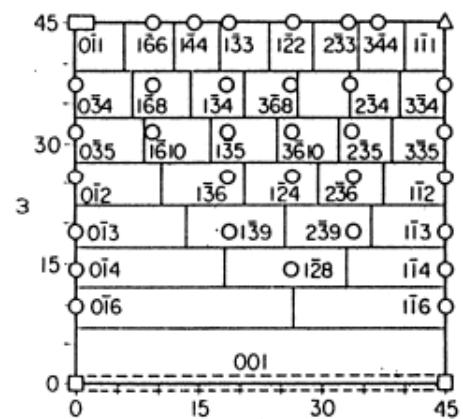
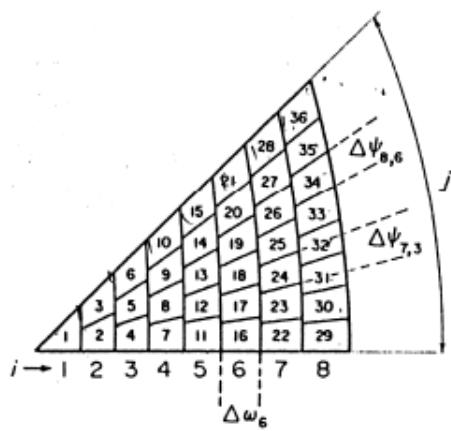
RBBox                    /Random

Intens                    Box内代表方位密度

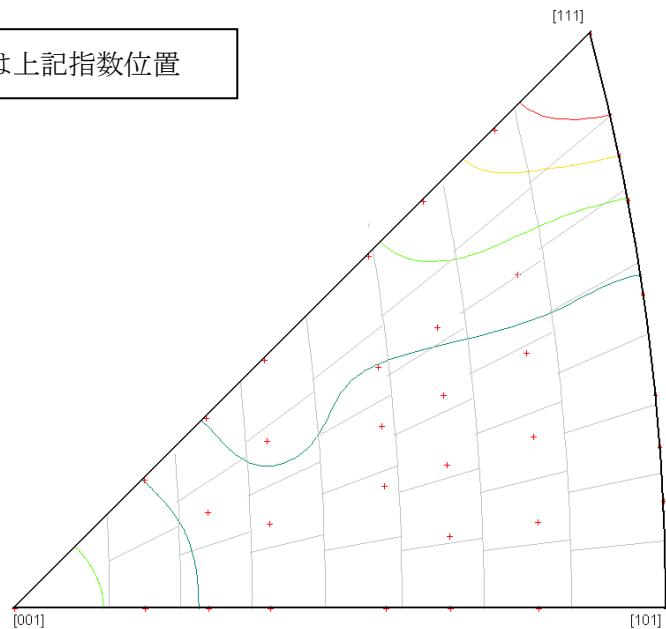
### 3 6 Box

日本金属学会報 第21巻 第11号 (1982)

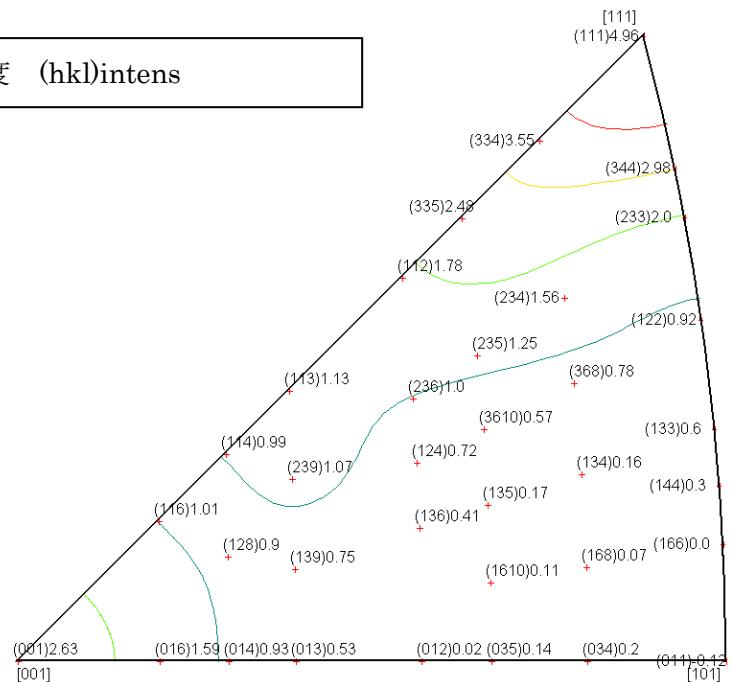
ベクトル法による集合組織の3次元解析 長嶋晋一氏より



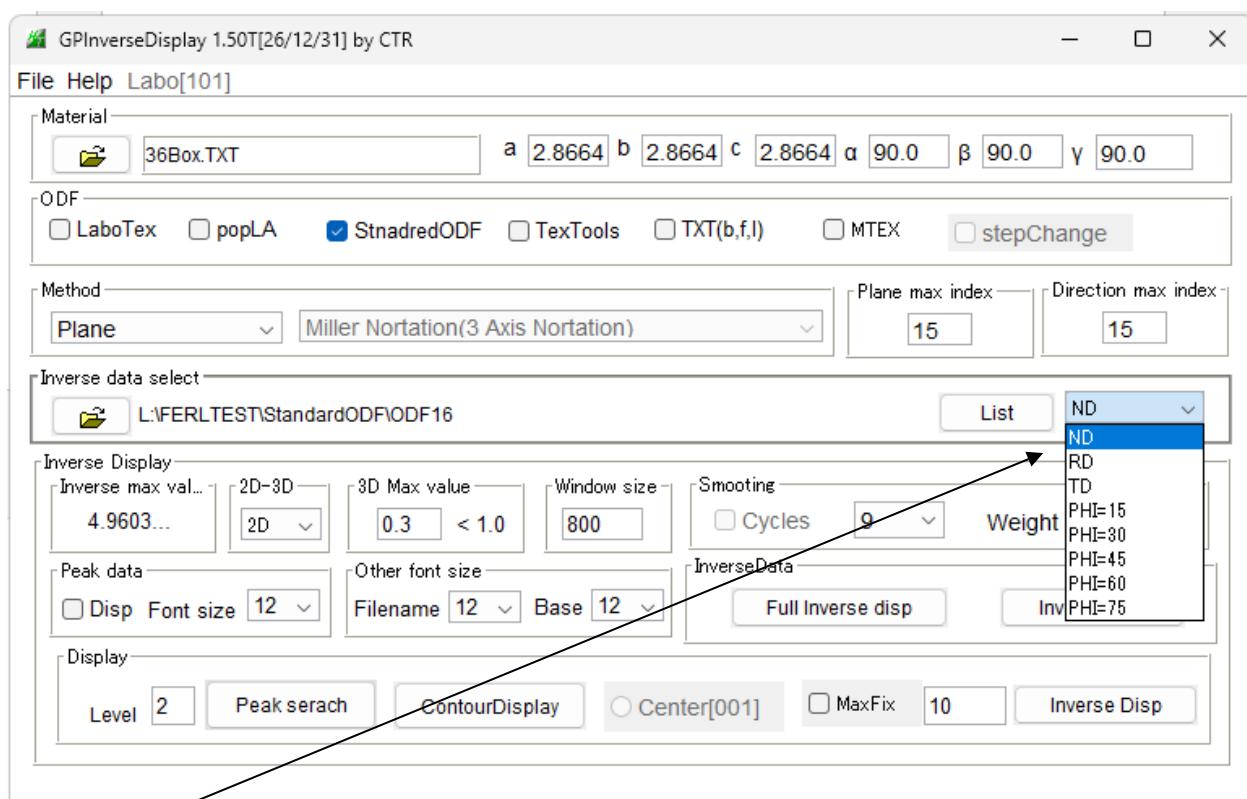
3 6 Box と代表方位位置 (+) は上記指数位置



3 6 Box 代表方位位置と方位密度 (hkl)intens

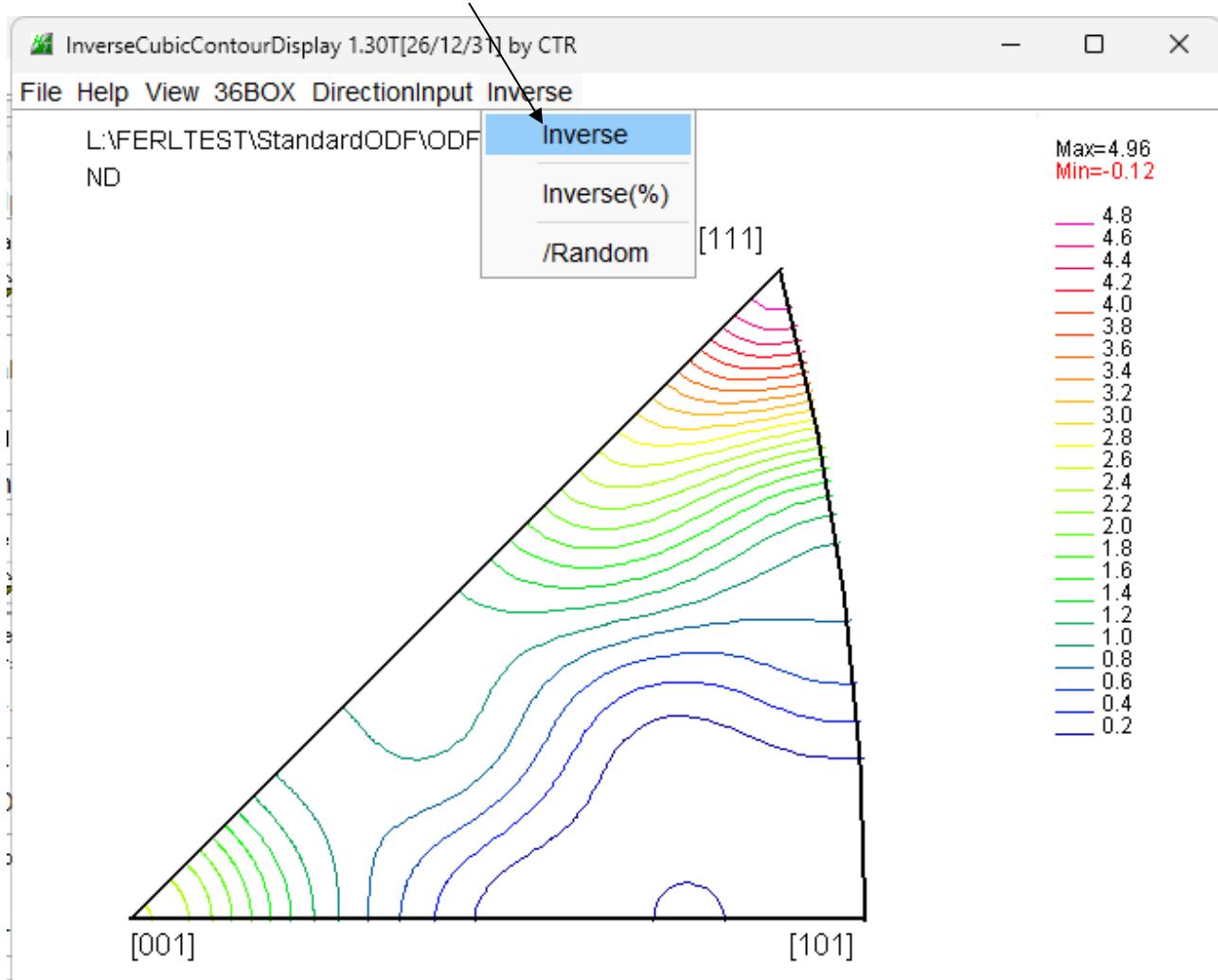


# Standard ODF 解析結果を GPI Inverse Display で解析



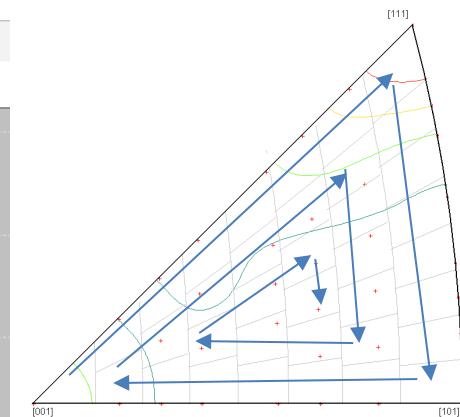
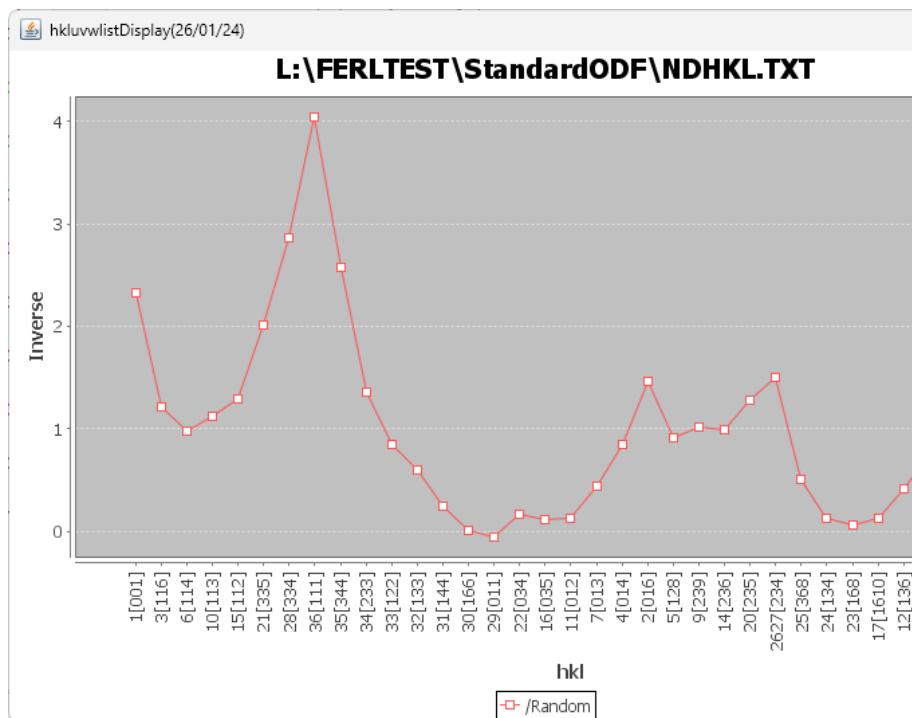
方向の選択

計算方法の選択



Inverse : Box 内の平均方位密度計算 A Box

ステレオ三角形 [0 0 1] から外周から CW 回転



list 方位密度 36Box 番号 CW 方向番号 A Box

fai	beta	(hkl)Intens	VNumber	CWBNumber	Inverse
0.0	0.0	(001)2.63	1	1	2.33
9.462	0.0	(016)1.59	2	21	1.458
13.263	45.0	(116)1.01	3	2	1.213
14.036	0.0	(014)0.93	4	20	0.855
15.616	26.565	(128)0.9	5	22	0.918
19.471	45.0	(114)0.99	6	3	0.974
18.435	0.0	(013)0.53	7	19	0.437
19.36	18.435	(139)0.75	8	33	0.76
21.832	33.69	(239)1.07	9	23	1.024
25.239	45.0	(113)1.13	10	4	1.12
26.565	0.0	(012)0.02	11	18	0.127
27.791	18.435	(136)0.41	12	32	0.421
29.206	26.565	(124)0.72	13	34	0.753
31.003	33.69	(236)1.0	14	24	0.999
35.264	45.0	(112)1.78	15	5	1.292
30.964	0.0	(035)0.14	16	17	0.115
31.311	9.462	(1610)0.11	17	31	0.129
32.312	18.435	(135)0.17	18	36	0.285
33.855	26.565	(3610)0.57	19	35	0.665
35.796	33.69	(235)1.25	20	25	1.281
40.316	45.0	(335)2.48	21	6	2.018
36.87	0.0	(034)0.2	22	16	0.161
37.247	9.462	(168)0.07	23	30	0.064
38.329	18.435	(134)0.16	24	29	0.133
39.981	26.565	(368)0.78	25	28	0.508
42.031	33.69	(234)1.56	26	27	1.088
46.686	45.0	(334)3.55	28	7	2.863
45.0	0.0	(011)-0.12	29	15	-0.049
45.392	9.462	(166)0.0	30	14	0.004
45.868	14.036	(144)0.3	31	13	0.245
46.508	18.435	(133)0.6	32	12	0.601
48.19	26.565	(122)0.92	33	11	0.855
50.238	33.69	(233)2.0	34	10	1.353
51.34	36.87	(344)2.98	35	9	2.574
54.736	45.0	(111)4.96	36	8	4.042

Intens (%) : 平均方位密度% A B Box

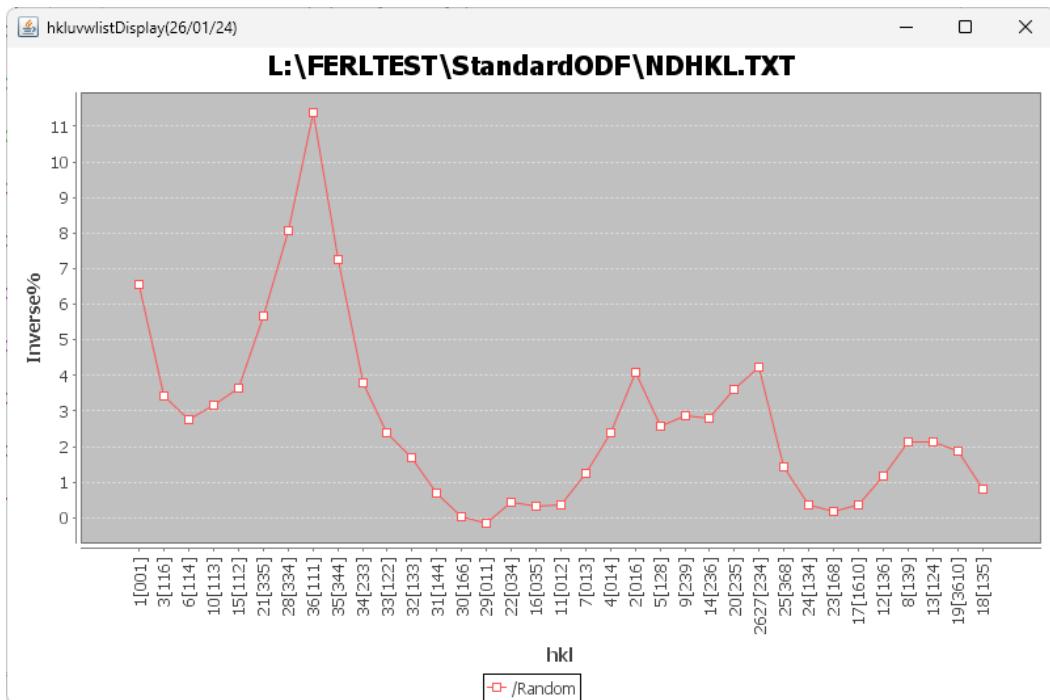
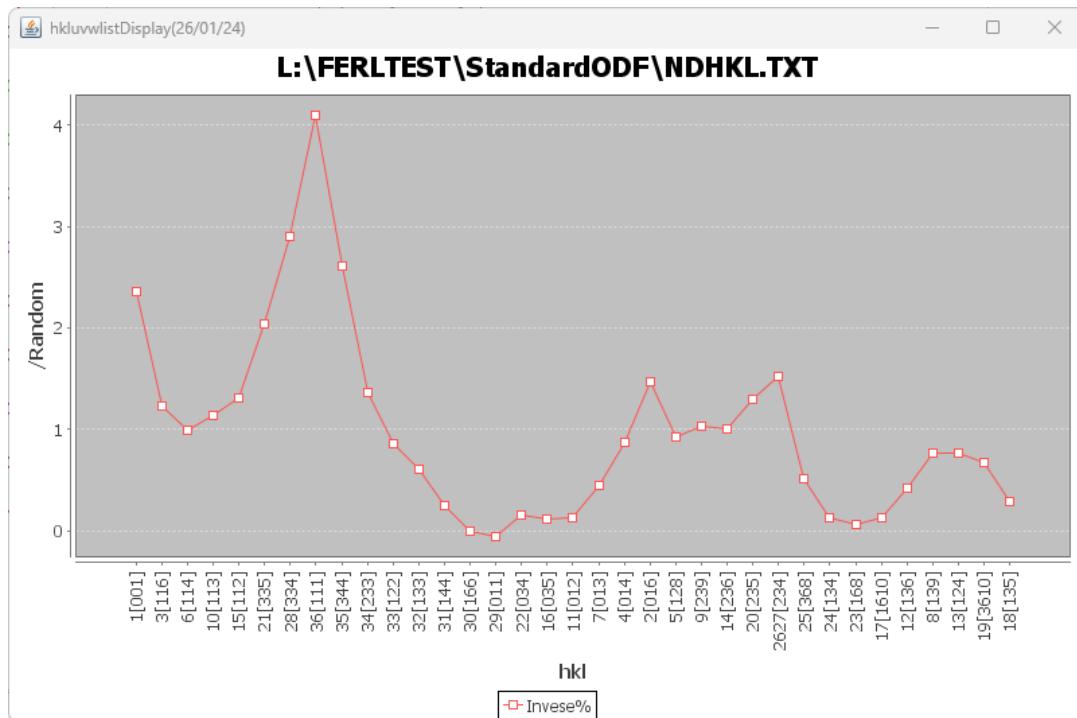


ABB o x

fai	beta	(hkl)Intens	VNumber	CWBNumber	Inverse(%)
0.0	0.0	(001)2.63	1	1	6.559
9.462	0.0	(016)1.59	2	21	4.103
13.263	45.0	(116)1.01	3	2	3.415
14.036	0.0	(014)0.93	4	20	2.407
15.616	26.565	(128)0.9	5	22	2.583
19.471	45.0	(114)0.99	6	3	2.742
18.435	0.0	(013)0.53	7	19	1.231
19.36	18.435	(139)0.75	8	33	2.14
21.832	33.69	(239)1.07	9	23	2.883
25.239	45.0	(113)1.13	10	4	3.152
26.565	0.0	(012)0.02	11	18	0.357
27.791	18.435	(136)0.41	12	32	1.186
29.206	26.565	(124)0.72	13	34	2.119
31.003	33.69	(236)1.0	14	24	2.812
35.264	45.0	(112)1.78	15	5	3.637
30.964	0.0	(035)0.14	16	17	0.324
31.311	9.462	(1610)0.11	17	31	0.363
32.312	18.435	(135)0.17	18	36	0.803
33.855	26.565	(3610)0.57	19	35	1.873
35.796	33.69	(235)1.25	20	25	3.605
40.316	45.0	(335)2.48	21	6	5.68
36.87	0.0	(034)0.2	22	16	0.453
37.247	9.462	(168)0.07	23	30	0.179
38.329	18.435	(134)0.16	24	29	0.374
39.981	26.565	(368)0.78	25	28	1.43
42.031	33.69	(234)1.56	26	27	3.064
46.686	45.0	(334)3.55	28	7	8.059
45.0	0.0	(011)-0.12	29	15	-0.137
45.392	9.462	(166)0.0	30	14	0.011
45.868	14.036	(144)0.3	31	13	0.689
46.508	18.435	(133)0.6	32	12	1.691
48.19	26.565	(122)0.92	33	11	2.406
50.238	33.69	(233)2.0	34	10	3.808
51.34	36.87	(344)2.98	35	9	7.246
54.736	45.0	(111)4.96	36	8	11.376

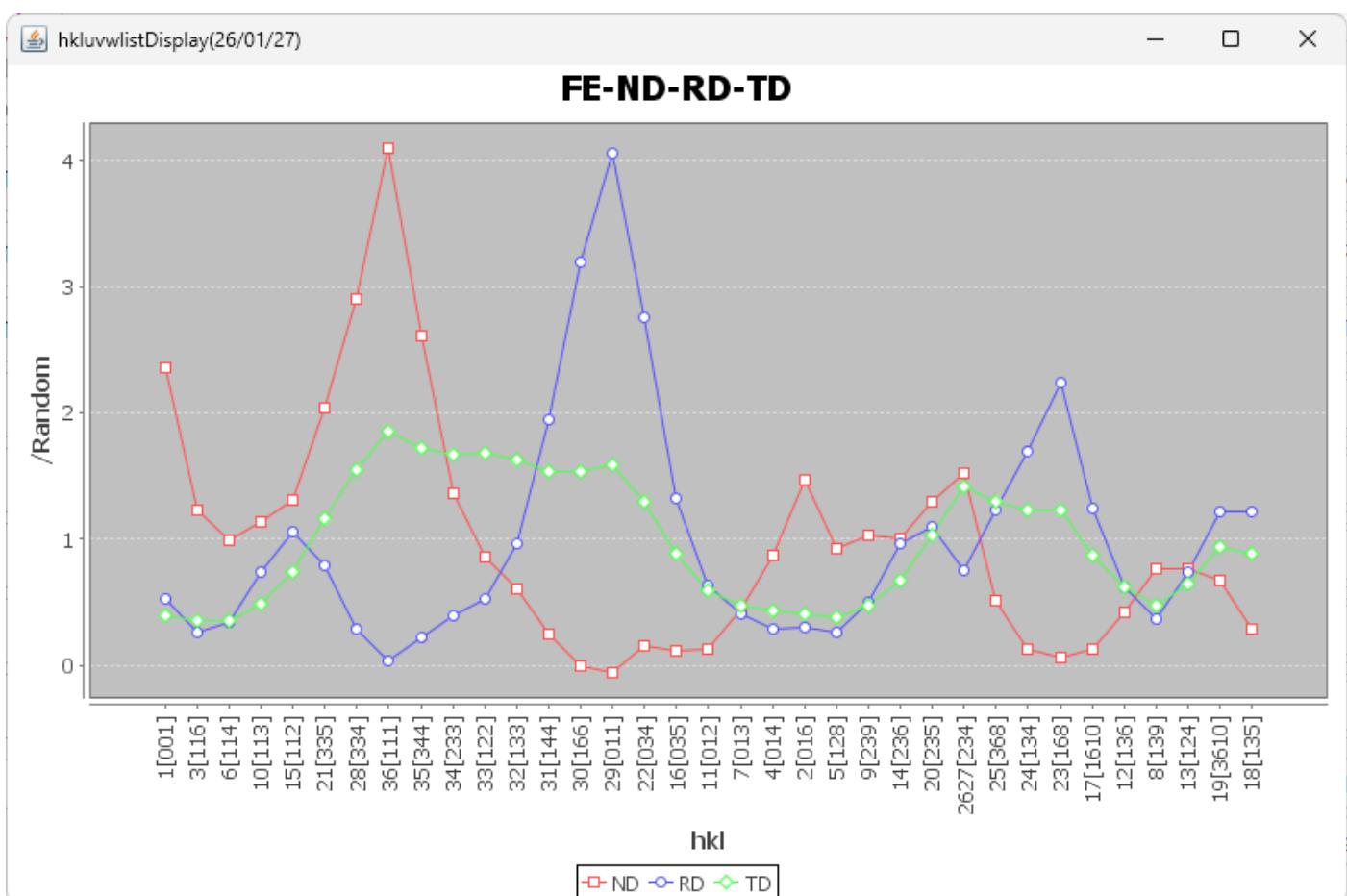
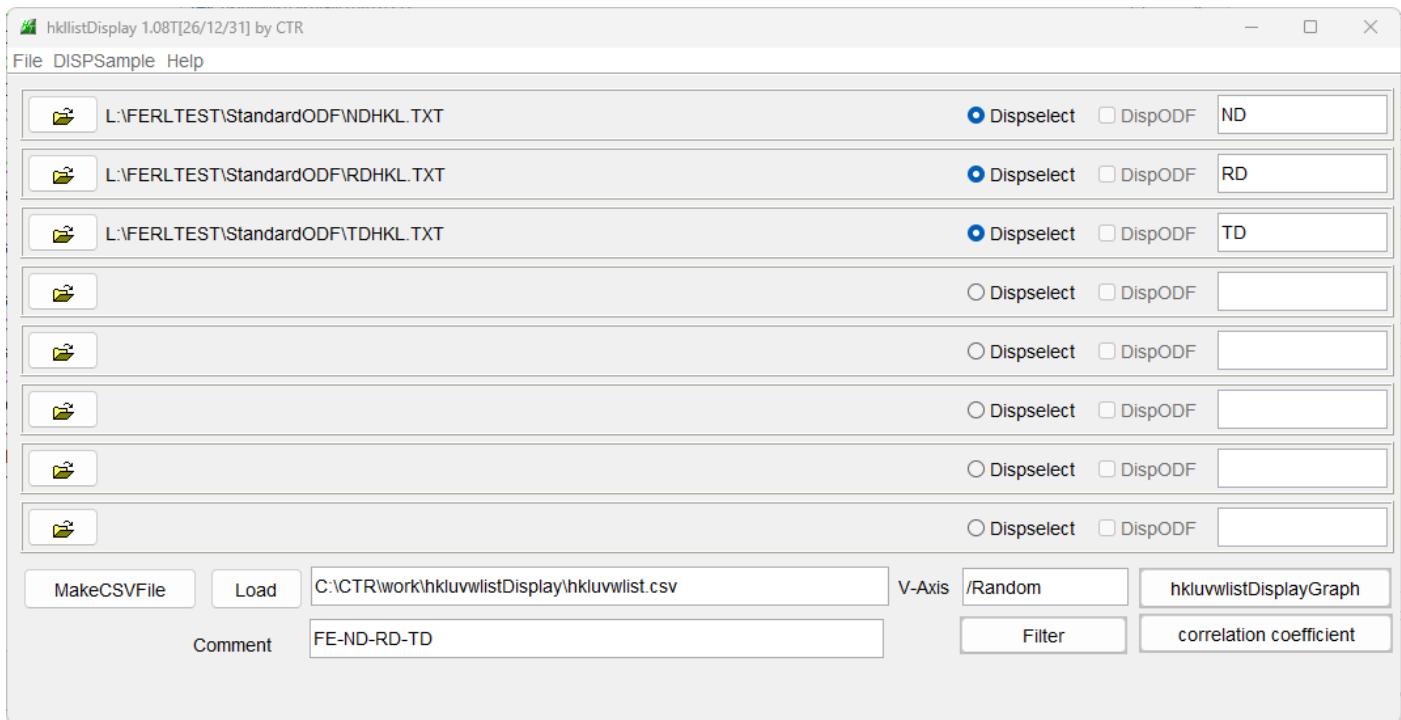
✓ Random : Random 比率 RB o x



R B o x

fai	beta	(hkl)Intens	VNumber	CWBNumber	/Random
0.0	0.0	(001)2.63	1	1	2.361
9.462	0.0	(016)1.59	2	21	1.477
13.263	45.0	(116)1.01	3	2	1.229
14.036	0.0	(014)0.93	4	20	0.867
15.616	26.565	(128)0.9	5	22	0.93
19.471	45.0	(114)0.99	6	3	0.987
18.435	0.0	(013)0.53	7	19	0.443
19.36	18.435	(139)0.75	8	33	0.77
21.832	33.69	(239)1.07	9	23	1.038
25.239	45.0	(113)1.13	10	4	1.135
26.565	0.0	(012)0.02	11	18	0.129
27.791	18.435	(136)0.41	12	32	0.427
29.206	26.565	(124)0.72	13	34	0.763
31.003	33.69	(236)1.0	14	24	1.012
35.264	45.0	(112)1.78	15	5	1.309
30.964	0.0	(035)0.14	16	17	0.117
31.311	9.462	(1610)0.11	17	31	0.131
32.312	18.435	(135)0.17	18	36	0.289
33.855	26.565	(3610)0.57	19	35	0.674
35.796	33.69	(235)1.25	20	25	1.298
40.316	45.0	(335)2.48	21	6	2.045
36.87	0.0	(034)0.2	22	16	0.163
37.247	9.462	(168)0.07	23	30	0.064
38.329	18.435	(134)0.16	24	29	0.135
39.981	26.565	(368)0.78	25	28	0.515
42.031	33.69	(234)1.56	26	27	1.103
46.686	45.0	(334)3.55	28	7	2.901
45.0	0.0	(011)-0.12	29	15	-0.049
45.392	9.462	(166)0.0	30	14	0.004
45.868	14.036	(144)0.3	31	13	0.248
46.508	18.435	(133)0.6	32	12	0.609
48.19	26.565	(122)0.92	33	11	0.866
50.238	33.69	(233)2.0	34	10	1.371
51.34	36.87	(344)2.98	35	9	2.609
54.736	45.0	(111)4.96	36	8	4.095

同様に RD, TD 方向を計算し、比較

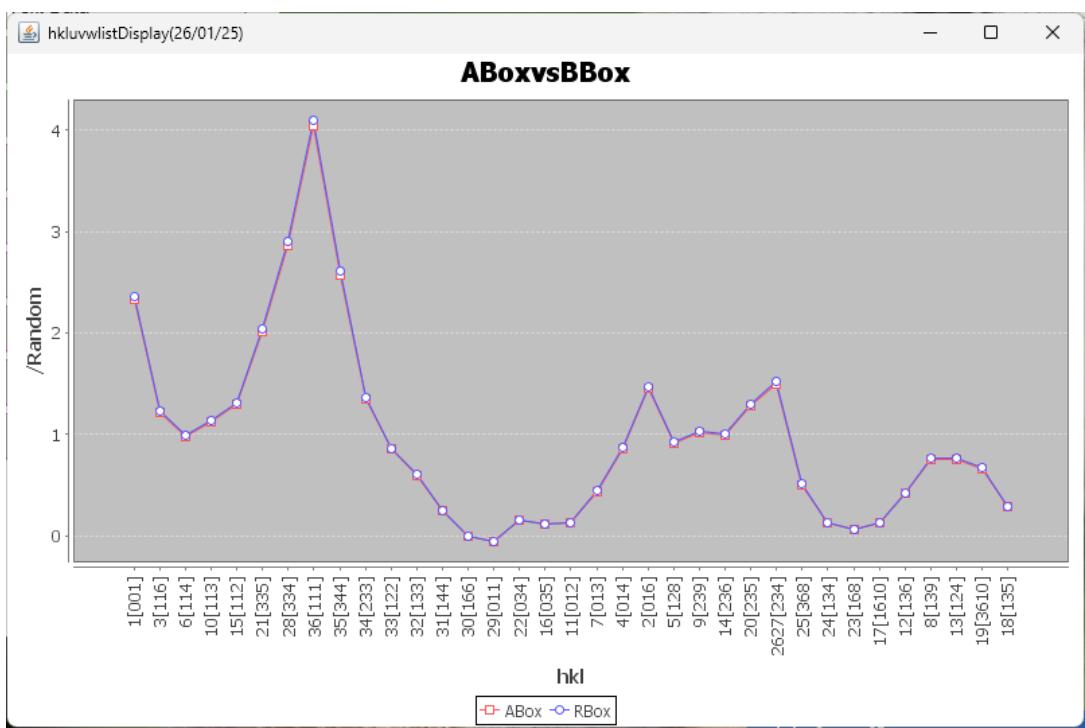
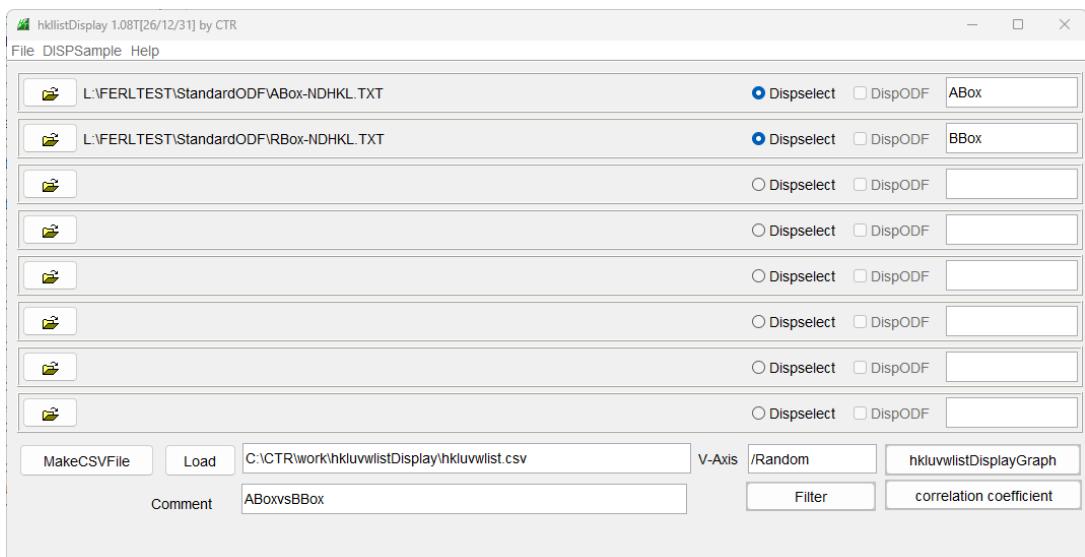


hkluvwDisplay correlation coefficient

ND : RD -0.576627

ND : TD 0.1857

## Box内の平均方位密度計算BoxとRandom比率Boxの比較

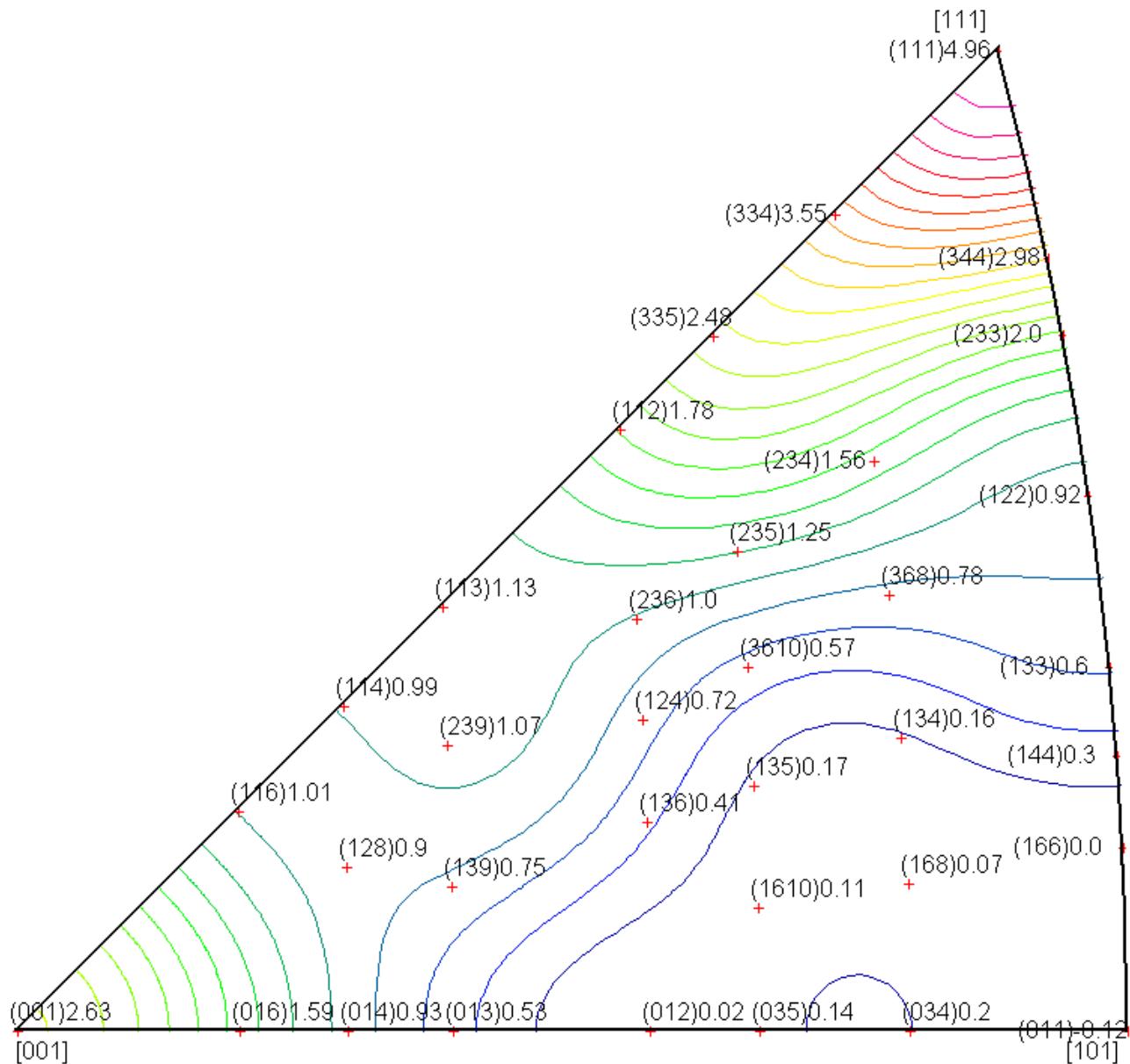
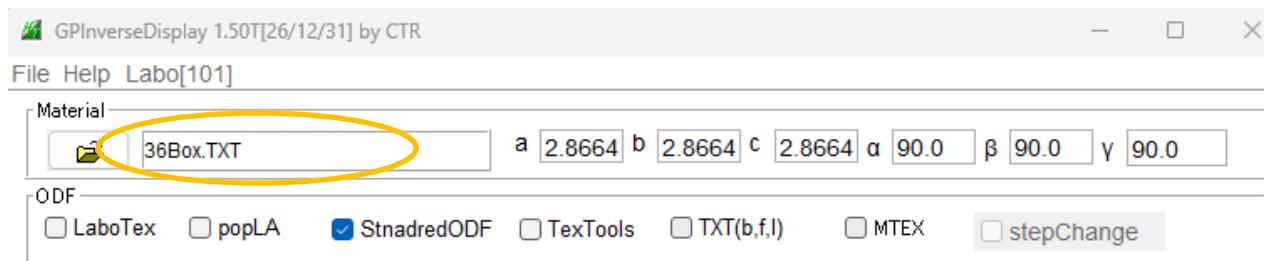


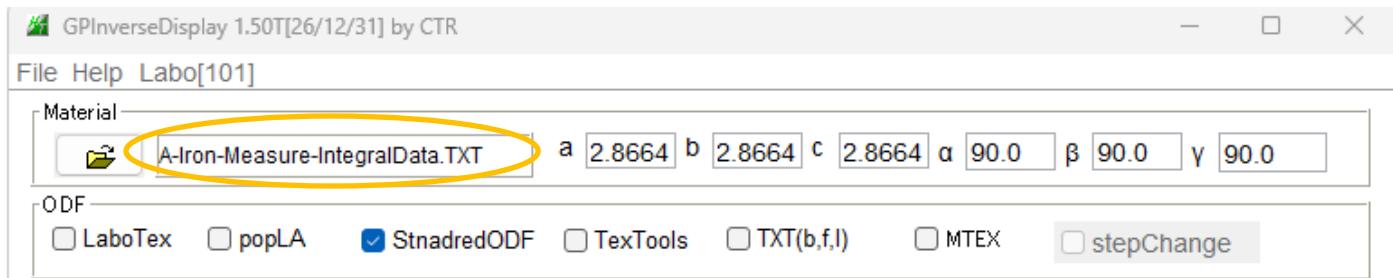
hkl,ABox,BBox  
1[001],2.33,2.361  
3[116],1.213,1.229  
6[114],0.974,0.987  
10[113],1.12,1.135  
15[112],1.292,1.309  
21[335],2.018,2.045  
28[334],2.863,2.901  
36[111],4.042,4.095  
35[344],2.574,2.609  
34[233],1.353,1.371  
33[122],0.855,0.866  
32[133],0.601,0.609  
31[144],0.245,0.248  
30[166],0.004,0.004  
29[011],-0.049,-0.049  
22[034],0.161,0.163  
16[035],0.115,0.117  
11[012],0.127,0.129  
7[013],0.437,0.443  
4[014],0.855,0.867  
2[016],1.458,1.477  
5[128],0.918,0.93  
9[239],1.024,1.038  
14[236],0.999,1.012  
20[235],1.281,1.298  
2627[234],1.5,1.519  
25[368],0.508,0.515  
24[134],0.133,0.135  
23[168],0.064,0.064  
17[1610],0.129,0.131  
12[136],0.421,0.427  
8[139],0.76,0.77  
13[124],0.753,0.763  
19[3610],0.665,0.674  
18[135],0.285,0.289

hkluvwDisplay correlation coefficient  
ABox : BBox 1.0

ほぼ同一

Box内 Intens は物質指定により変わります。

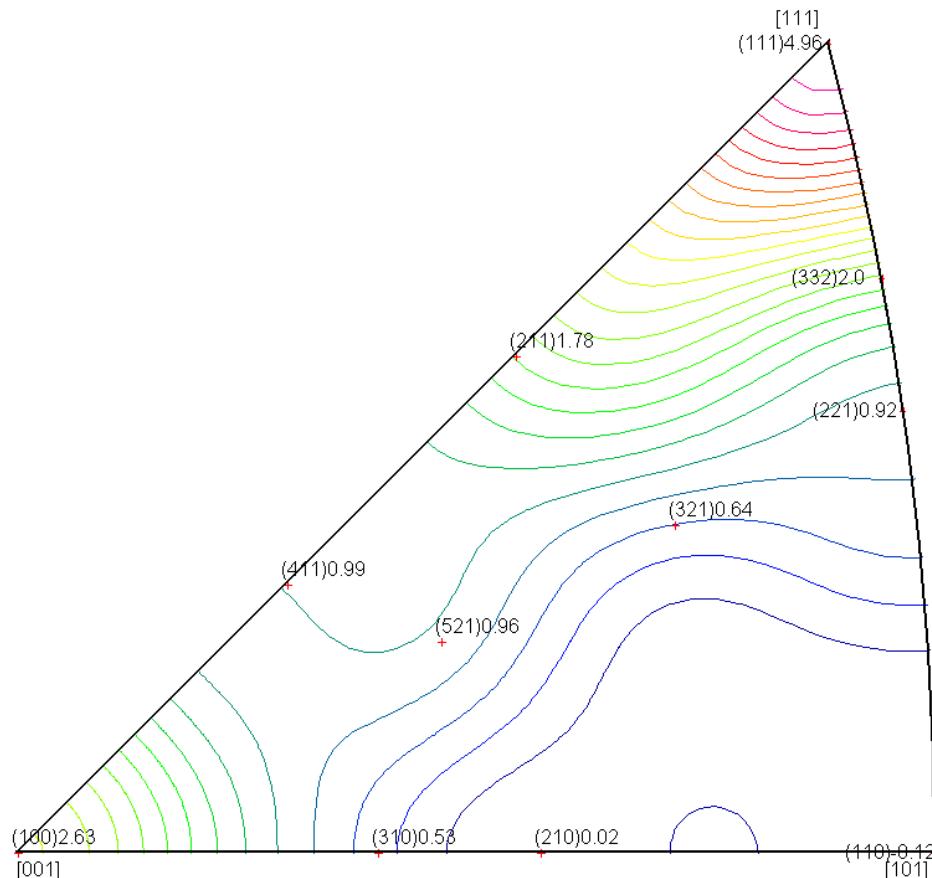




$\theta / \theta$  Scan 法でも同一情報が得られます。

fai	beta	(hkl)Intens	VNumber	CWBNumber	Inverse
45.0	0.0	(110)-0.12	1	1	2.33
0.0	0.0	(100)2.63	2	21	1.458
35.264	45.0	(211)1.78	3	2	1.213
18.435	0.0	(310)0.53	4	20	0.855
54.736	45.0	(111)4.96	5	22	0.918
36.699	26.565	(321)0.64	6	3	0.974
19.471	45.0	(411)0.99	7	19	0.437
26.565	0.0	(210)0.02	8	33	0.76
50.238	33.69	(332)2.0	9	23	1.024
24.095	26.565	(521)0.96	10	4	1.12
48.19	26.565	(221)0.92	11	18	0.127

逆極点では、 $\alpha$  - Fe の (220) は (110)、(442) は (221) として扱うため  
表示されません

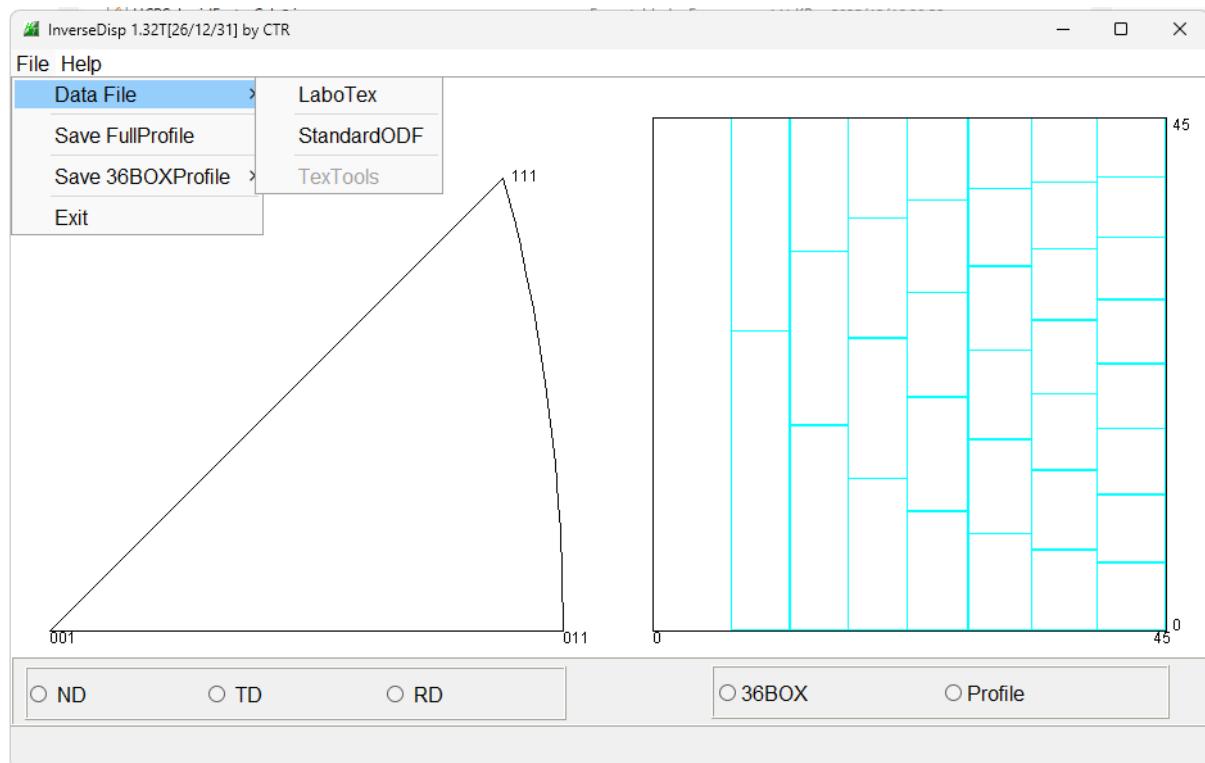


$\theta / \theta$  Scan 法より 3 6 Box 法は得られるデータが多い

更に、ND 方向以外のデータも得られます。

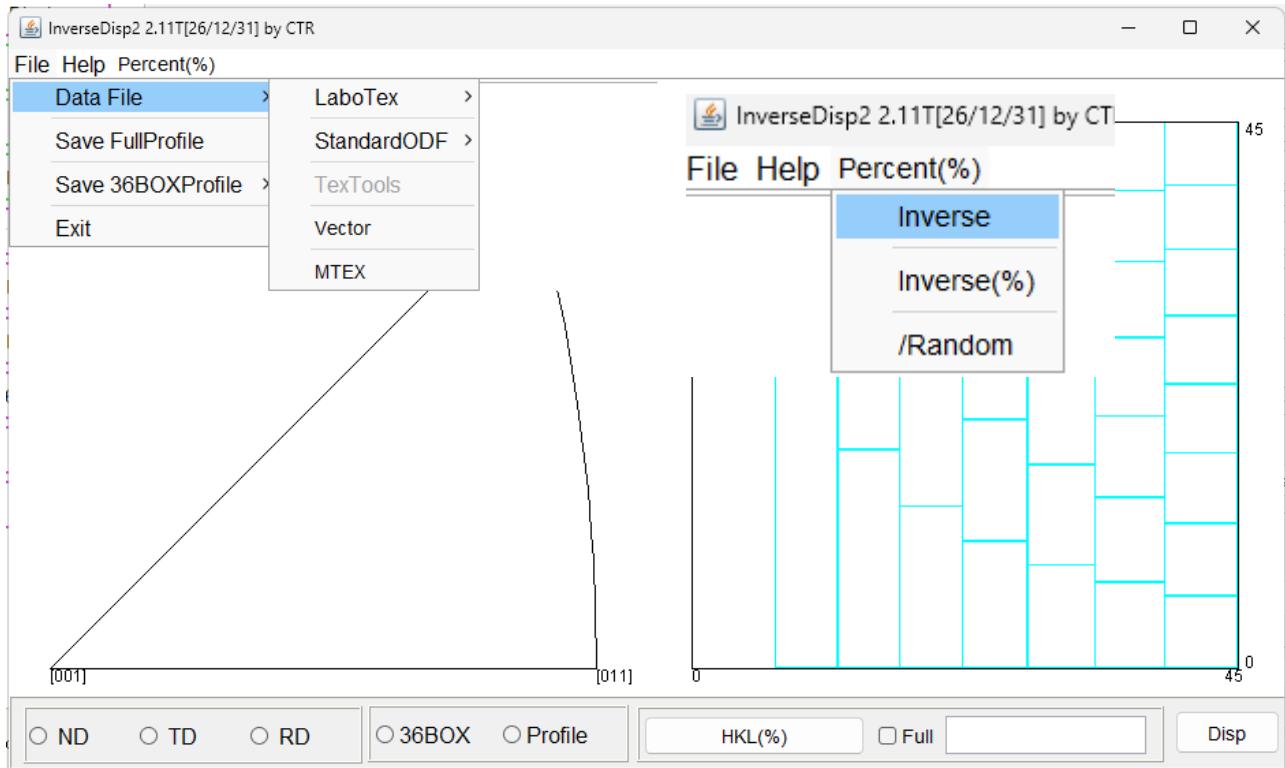
## ソフトウェアの機能紹介

### Inversedisp



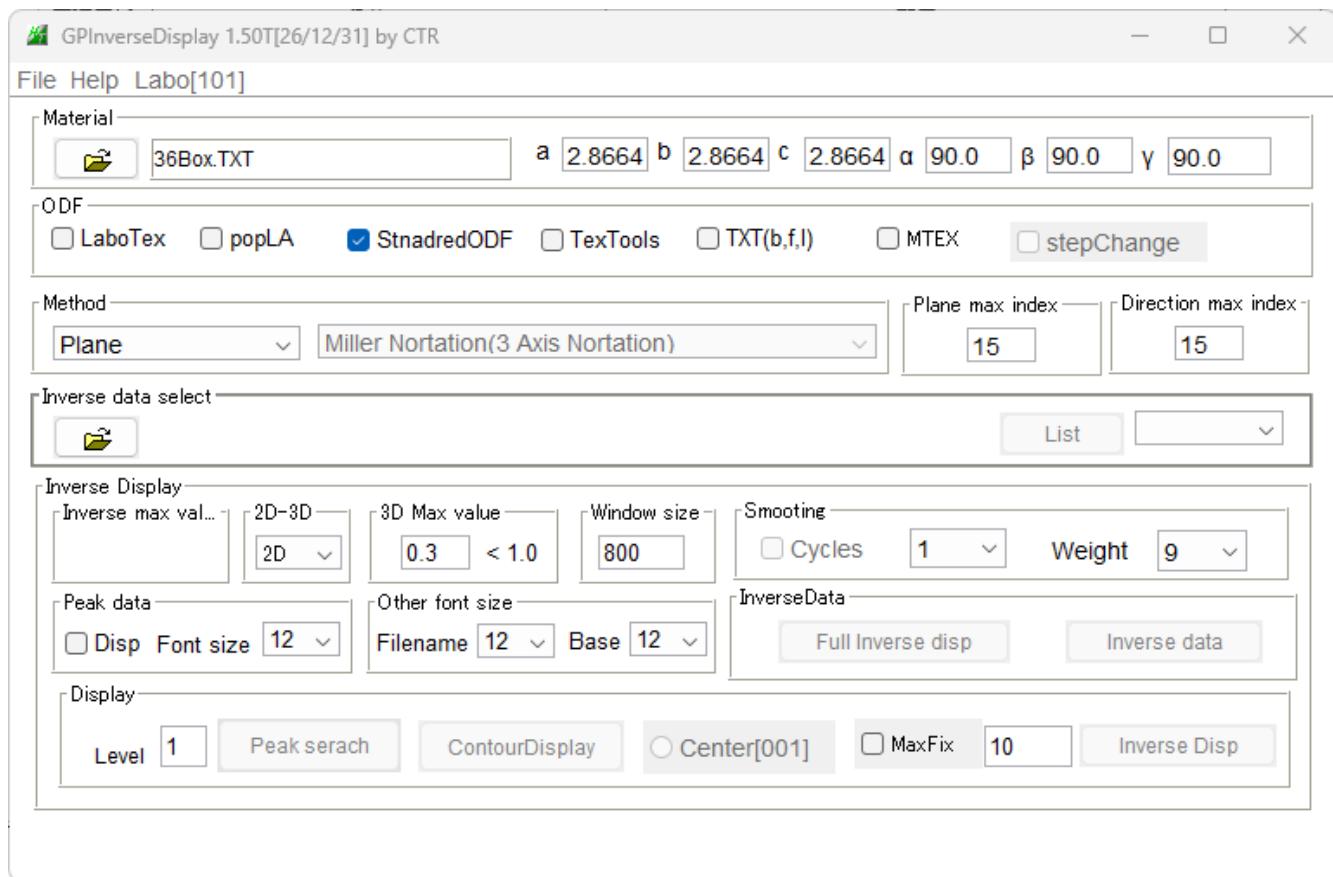
LaboTex, StandardODFデータの36Box平均密度計算 (Box) のみ

### Inversedisp2

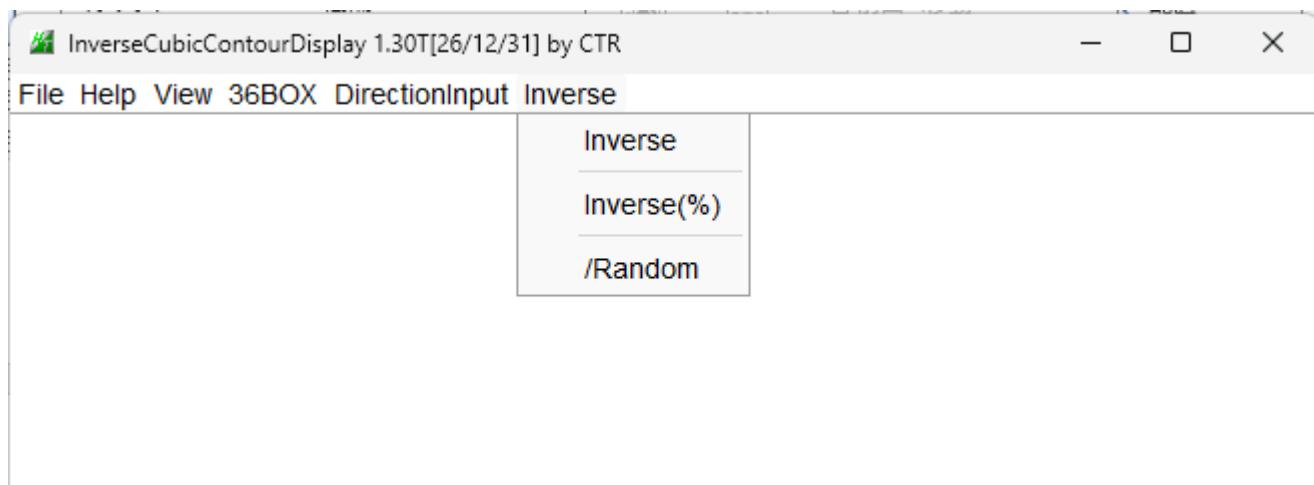


LaboTex, StandardODF, Vector, MTEXの  
36Box平均密度 (Box)、平均密度 (%) (ABBox)、random比率 (RBox)

# GPI Inverse Display + Inverse Cubic Contour Display



LaboTeX, popLA, StandardODF, TexTools, MTEXに対し



36Box 平均密度 (ABox)、平均密度 (%) (ABBox)、random比率 (RBox) 处理