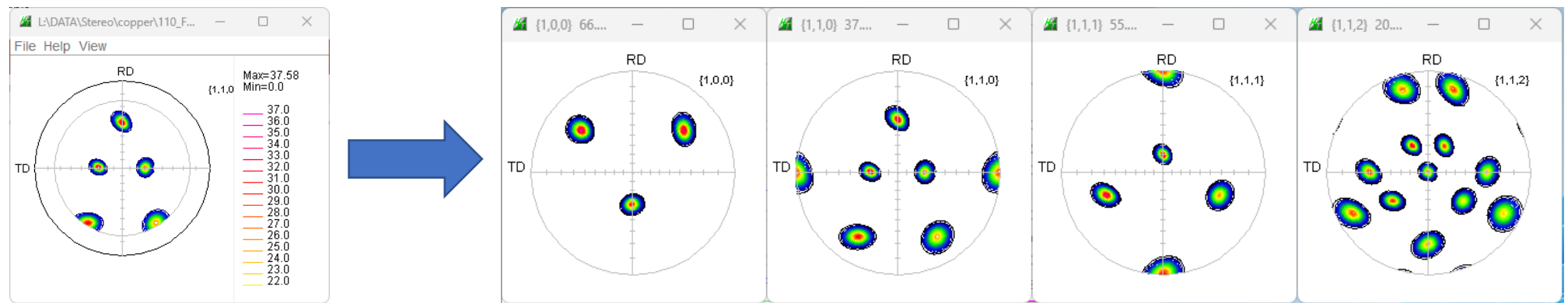


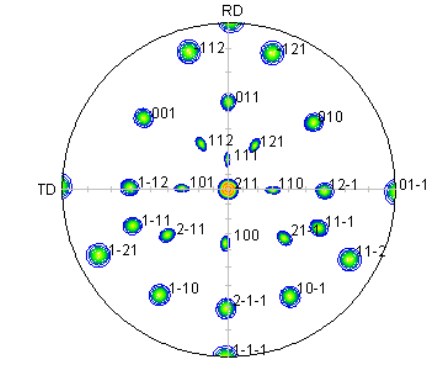
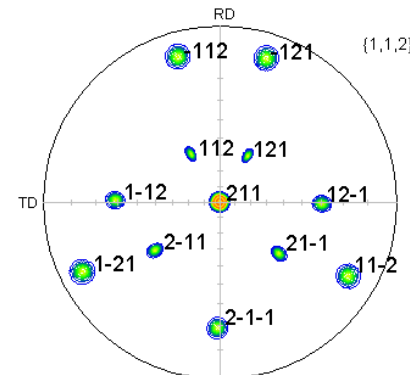
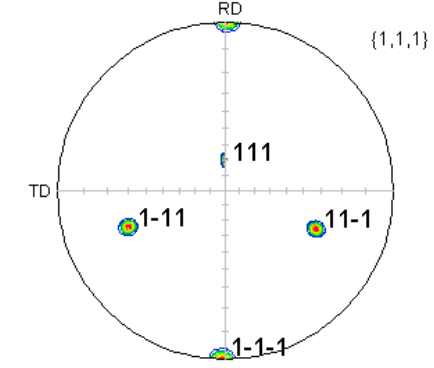
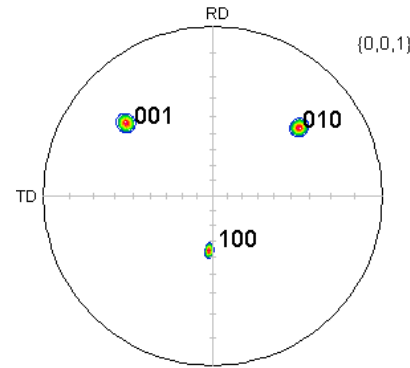
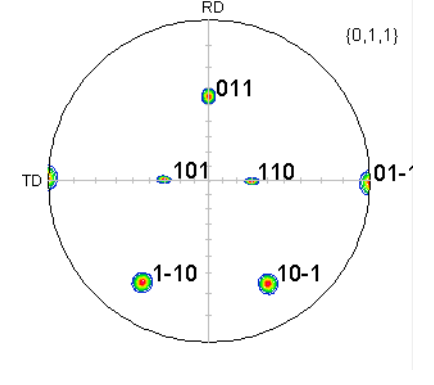
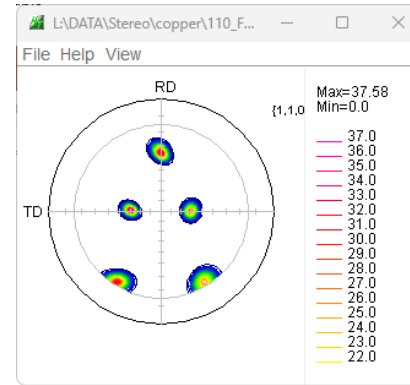
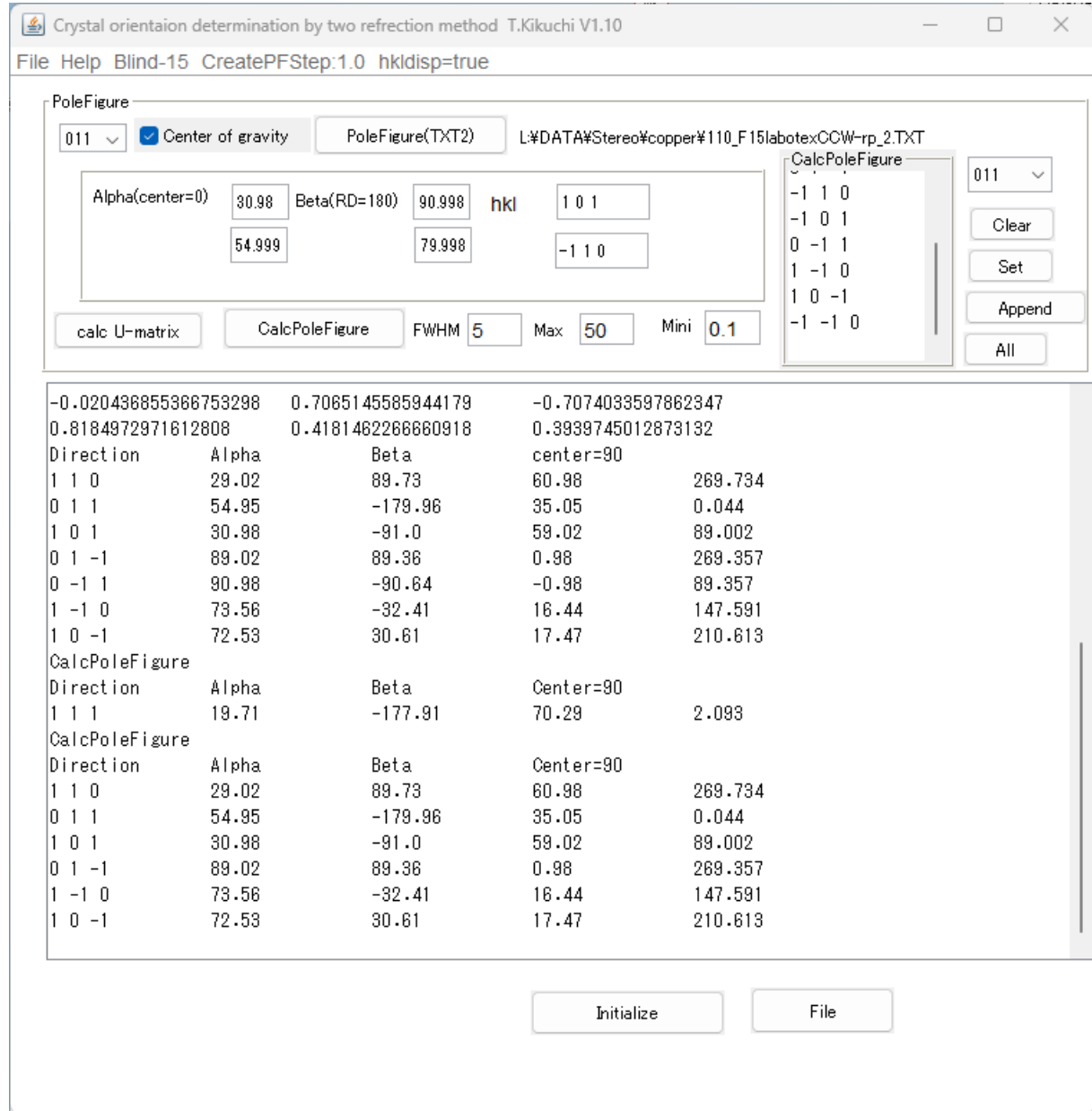
ND->RD, ND->TD, RD->TD方向回転Schmid因子

Schmid因子計算はND方向から計算される
引っ張りではTD方向やRD方向に引っ張る
ラウエカメラや極点図では、ND方向方位が求まる
引っ張りSchmid因子計算はNDに対しTD回転、RD回転で求める
測定時、RD方向取付は慎重に設定する
copper方位を例にBCCSchmidFactorCalcで手順を説明します。



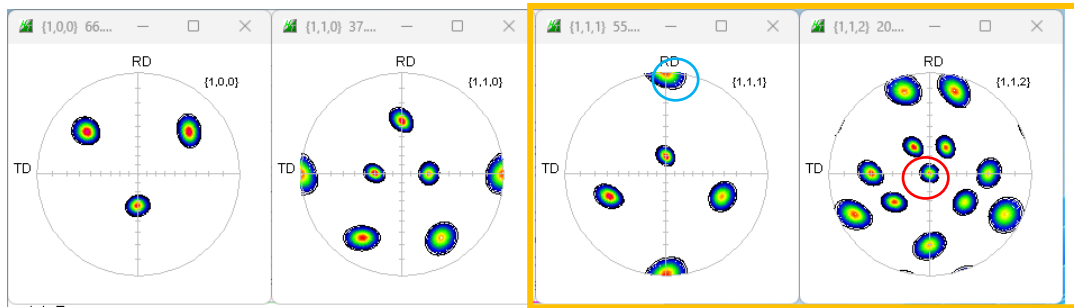
{110}反射極点図から完全極点図4面を計算

同一反射の確認を行う



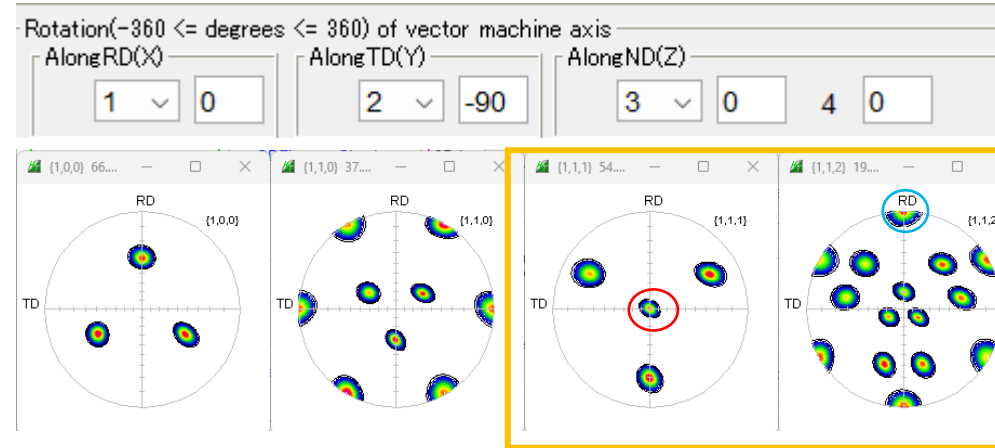
ODF解析で {112}<-1-11>が得られる

Copper方位の回転



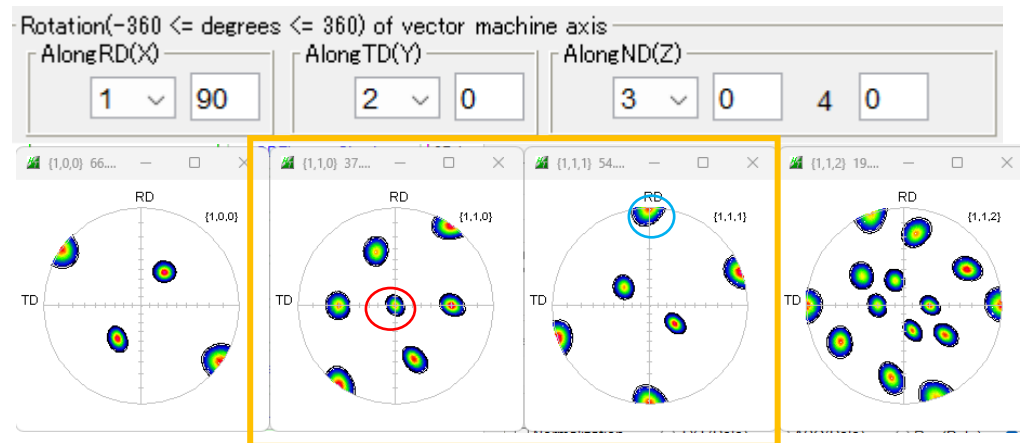
TD軸回転でRD方向

ND->RD (112)->(111)



RTD軸回転でTD方向

ND->TD (112)->(110)



Schmid因子：RD方向は[111]から計算、TD方向は[110]から計算される

RD方向 (TD軸回転) (uvw)<hkl>を得る

CrystalRotation 1.09T[23/12/31] by CTR

File Help **RD(TDrotate)** {uvw}<hkl> {112}<-1-11> RV:Integer Orthorhombic

Material: Cubic
1.0 1.0 1.0 90.0 90.0 90.0

{hkl|Kuvw}>
1 1 2 -1 -1 1 Disp

Rotation vector of crystal axis
 -1 1 0 SET CTD

Rotation vector of machine axis(LaboTex,MTEX) Rotation angle
 0 1 0 SET **-90** Calc Disp

Result

RD	TD	ND
-1.0	-1.0	1.0
-1.0	1.0	1.0
1.0	0.0	2.0

RDaxis [-1 -1 1]
TDaxis [-1 1 0]
 NDaxis [1 1 2]

-1.0 1.0 0.0 (-1 1 0)
 {112}<-1-11> eulerangle:(90.0,35.264,45.0)
 Eulerangle g(φ1 φ2)=
 -0.5774 0.7071 0.4082
 -0.5774 0.0 0.4082
 0.5774 0.0 0.8165

Rotation [-1,1,0] angle:-90.0
 Calc-d=(-0.7071,0.7071,0.0)
 a(-1.0,1.0,0.0),-90.0

Rotated Eulerangle
 0.5 -0.5 0.7071
 -0.5 0.5 0.7071
 -0.7071 -0.7071 0.0

Rotated RD TD ND
 0.4082 0.3536 0.5774
 0.4082 -0.3536 0.5774
 0.8165 0.5 0.5774

Calc Miller indices
 {1.0 1.0 -1.0}<1.0 1.0 2.0>
 {1 1 1}<-2 1>

{1 1 1|K-1-2 |> set{hkl|Kuvw> ResultCreat

Result: {11-1}<112> toOrthorhombic {111}<-1-21> (30.0 54.74 45.0)

TD方向 (RD軸回転) (xxx)<uvw>を得る

CrystalRotation 1.09T[23/12/31] by CTR

File Help **TD(RDrotate)** {uvw}<hkl> {112}<-1-11> RV:Integer Orthorhombic

Material: Cubic
1.0 1.0 1.0 90.0 90.0 90.0

{hkl|Kuvw}>
1 1 2 -1 -1 1 Disp

Rotation vector of crystal axis
 -1 -1 1 SET CTD

Rotation vector of machine axis(LaboTex,MTEX) Rotation angle
 1 0 0 SET **90** Calc Disp

Result

RD	TD	ND
-1.0	-1.0	1.0
-1.0	1.0	1.0
1.0	0.0	2.0

RDaxis [-1 -1 1]
 TDaxis [1 1 0]
 NDaxis [1 1 2]

-1.0 -1.0 1.0 (-1 -1 1)
 {112}<-1-11> eulerangle:(90.0,35.264,45.0)
 Eulerangle g(φ1 φ2)=
 -0.5774 0.7071 0.4082
 -0.5774 0.0 0.4082
 0.5774 0.0 0.8165

Rotation [-1,-1,1] angle:90.0
 Calc-d=(-0.5774,-0.5774,0.5774)
 a(-1.0,-1.0,1.0),90.0

Rotated Eulerangle
 0.3333 0.9107 0.244
 -0.244 0.3333 -0.9107
 -0.9107 0.244 0.3333

Rotated RD TD ND
 -0.5774 0.2357 0.7071
 -0.5774 -0.1725 -0.7071
 0.5774 0.244 0.0

Calc Miller indices
 {1.0 -1.0 0.0}<-1.0 -1.0 1.0>
 {1 0 1}<-1 -1 1>

{1 0 1|K-1-1 |> set{hkl|Kuvw> ResultCreat

Result: {1-10}<-1-11> toOrthorhombic {101}<-1-11> (54.74 45.0 90.0)

RD (112)->(111)

TD (112)->(101)

Schmid因子計算

RD(112)->(111): SF=0.314

BCCSchmidFactorCalc3 3.11T[23/12/31] by CTR

File Help Text SlipProfile **RD(TDRotate)** abs(SF) Orthorhombic

InputFile(TXT)
LaboTex VolumeFraction(SumVFmode) {1 1 2}<-1 -1 1> 100.0

Slip Systems
 {011}<11-1> {112}<11-1> {123}<11-1> FCC{111}<1-10> Inverse

Data input
 real h k l or [h k l] phi1 PHI phi2 phi1<=90,PHI<=90

{1 1 2}<-1 -1 1> 100.0

-0.272	0.0	0.272	0.0
0.0	0.0	-0.157	-0.157
-0.314	0.314	-0.157	-0.157
-0.157	0.314	-0.157	0.0
0.0	0.0	0.0	0.0
0.0	-0.103	-0.206	-0.206
-0.103	-0.309	-0.309	0.309
0.309	0.103	0.206	0.103
0.206	0.206	0.103	0.309
0.309	0.206	0.103	0.309

input	VF%	Schmid	VF*Schmid%
{1.01.02.0}<-1.0-1.01.0>	100.0	0.314	0.314
VFsum=100.0% VF*Schmidsum=0.314			
SchmidFactor(SumVF)=0.314			

AlongRD(X) 3 0 AlongTD(Y)<=0 2 -90 AlongND(Z) 1 0 4 0

{1 -1}<1 1 2> toOrthorhombic {1 1 1}<-1 -2 1>

SchmidFactorProfile
 ND->RD all Step 15

AXISRotation HKLDouble

Clear
 SlipDisp
 Schmidcalc
 Symmetry SchmidCalc
 SchmidFDisp

TD(112)->(101): SF=0.471

BCCSchmidFactorCalc3 3.11T[23/12/31] by CTR

File Help Text SlipProfile **TD(RDRotate)** abs(SF) Orthorhombic

InputFile(TXT)
LaboTex VolumeFraction(SumVFmode) {1 1 2}<-1 -1 1> 100.0

Slip Systems
 {011}<11-1> {112}<11-1> {123}<11-1> FCC{111}<1-10> Inverse

Data input
 real h k l or [h k l] phi1 PHI phi2 phi1<=90,PHI<=90

{1 1 2}<-1 -1 1> 100.0

-0.408	0.0	0.408	-0.236
0.471	-0.236	0.0	0.0
0.0	0.0	0.0	0.0
-0.236	0.471	-0.236	-0.309
-0.154	0.463	0.463	-0.309
-0.154	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0
0.0	0.309	0.154	0.463
0.463	0.309	0.154	0.463

input	VF%	Schmid	VF*Schmid%
{1.01.02.0}<-1.0-1.01.0>	100.0	0.471	0.471
VFsum=100.0% VF*Schmidsum=0.471			
SchmidFactor(SumVF)=0.471			

AlongRD(X) 3 90 AlongTD(Y)<=0 2 0 AlongND(Z) 1 0 4 0

{1 -1 0}<-1 -1 1> toOrthorhombic {1 0 1}<-1 -1 1>

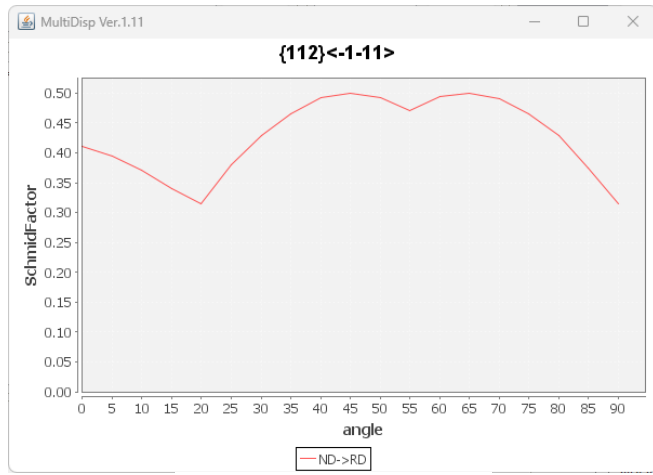
SchmidFactorProfile
 ND->TD all Step 15

AXISRotation HKLDouble

Clear
 SlipDisp
 Schmidcalc
 Symmetry SchmidCalc
 SchmidFDisp

方位の回転

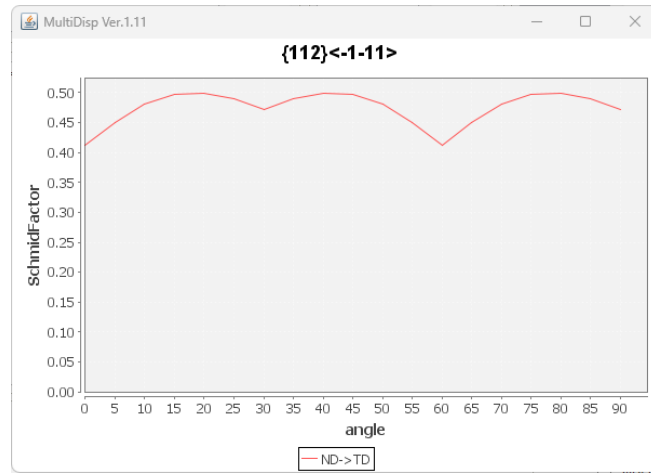
ND->RD



OBJFILE= {112}<-1-11>
COMMENT
AXIS=angle ND->RD
DATA-NUMBER=19

angle	SchmidFactor	Direction
0.0	0.4115	ND
5.0	0.3947	
10.0	0.371	
15.0	0.3409	
20.0	0.3143	
25.0	0.3795	
30.0	0.4285	
35.0	0.465	
40.0	0.492	
45.0	0.5	
50.0	0.4925	
55.0	0.4714	
60.0	0.4939	
65.0	0.4999	
70.0	0.4903	
75.0	0.465	
80.0	0.4285	
85.0	0.3742	
90.0	0.3143	

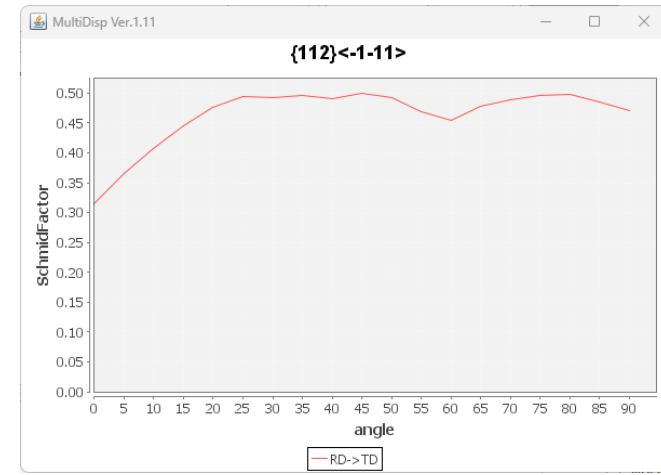
ND->TD



OBJFILE= {112}<-1-11>
COMMENT
AXIS=angle ND->TD
DATA-NUMBER=19

angle	SchmidFactor	Direction
0.0	0.4115	
5.0	0.4504	
10.0	0.481	
15.0	0.4967	
20.0	0.4991	
25.0	0.4891	
30.0	0.4714	
35.0	0.4891	
40.0	0.4991	
45.0	0.4967	
50.0	0.481	
55.0	0.4504	
60.0	0.4115	
65.0	0.4504	
70.0	0.481	
75.0	0.4967	
80.0	0.4991	
85.0	0.4891	
90.0	0.4714	TD

RD->TD

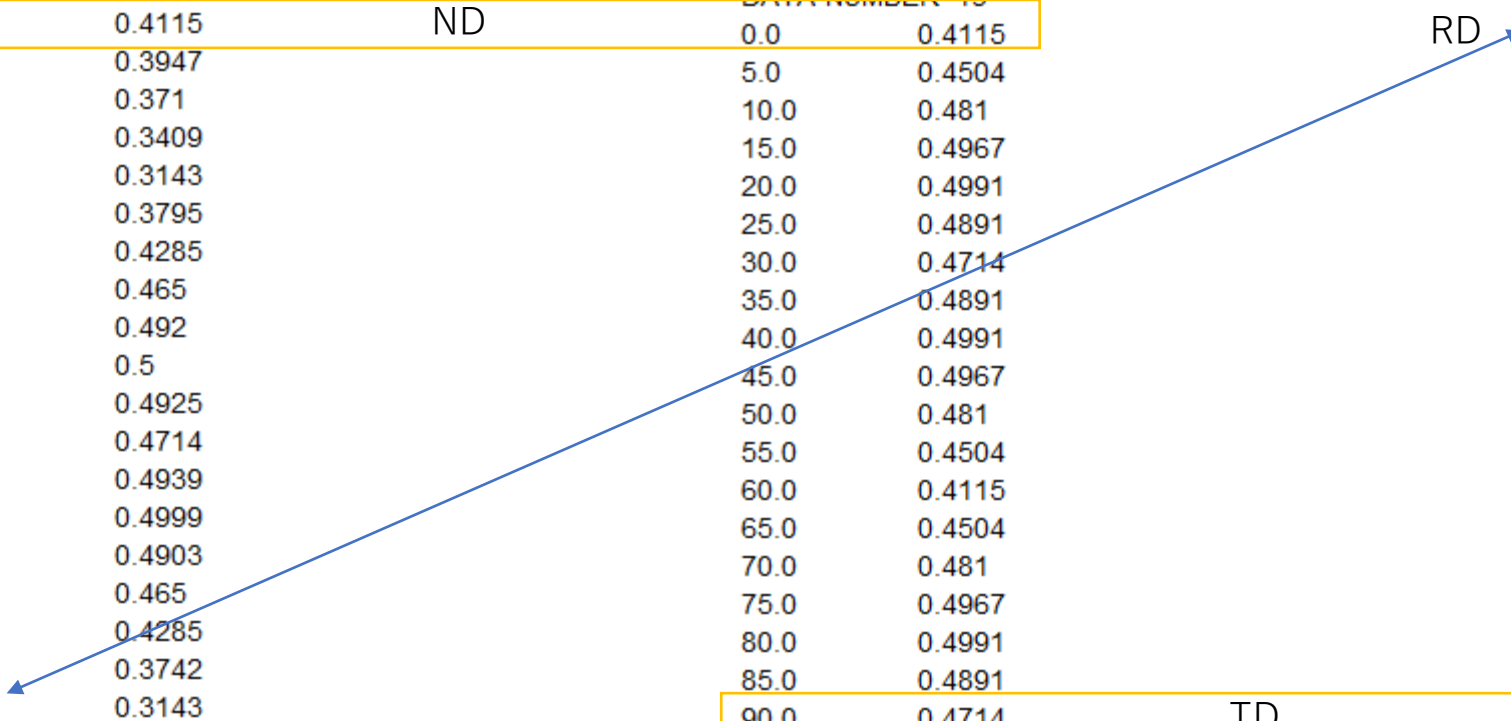


OBJFILE= {112}<-1-11>
COMMENT
AXIS=angle RD->TD
DATA-NUMBER=19

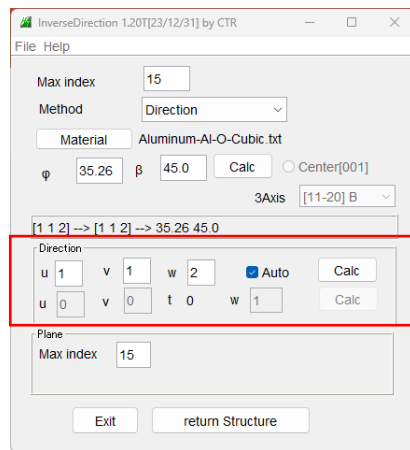
angle	SchmidFactor	Direction
0.0	0.3143	
5.0	0.3653	
10.0	0.4071	
15.0	0.4449	
20.0	0.4769	
25.0	0.4941	
30.0	0.493	
35.0	0.4959	
40.0	0.4899	
45.0	0.4999	
50.0	0.4921	
55.0	0.4698	
60.0	0.4539	
65.0	0.4782	
70.0	0.4892	
75.0	0.4969	
80.0	0.4972	
85.0	0.4852	
90.0	0.4714	

RD

RD

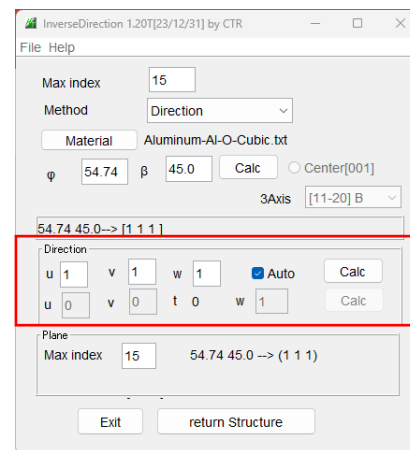
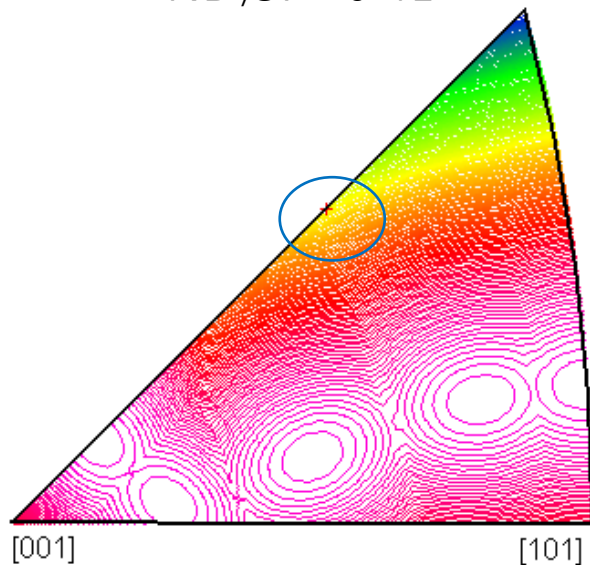


BCCSchmid因子ステレオ三角形からSchmid因子を読み取る



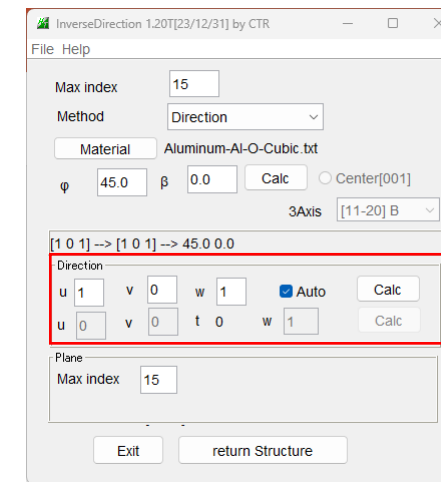
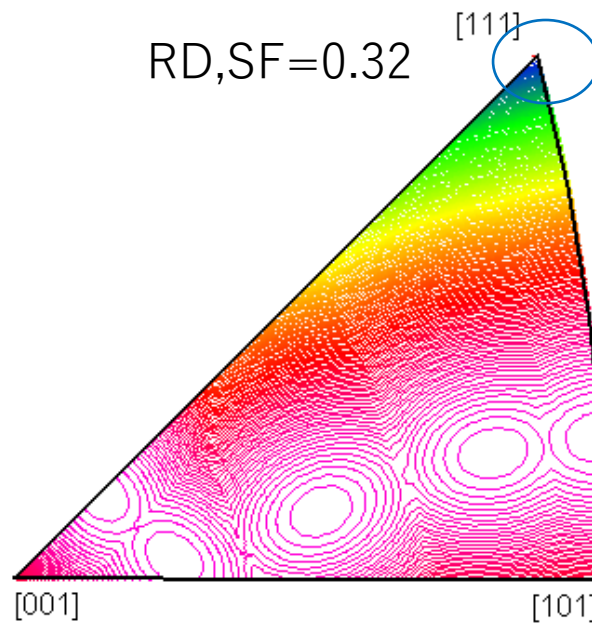
C:\CTR\work\SchmidLowBCC\Inverse.txt

ND, SF=0.41 [111]



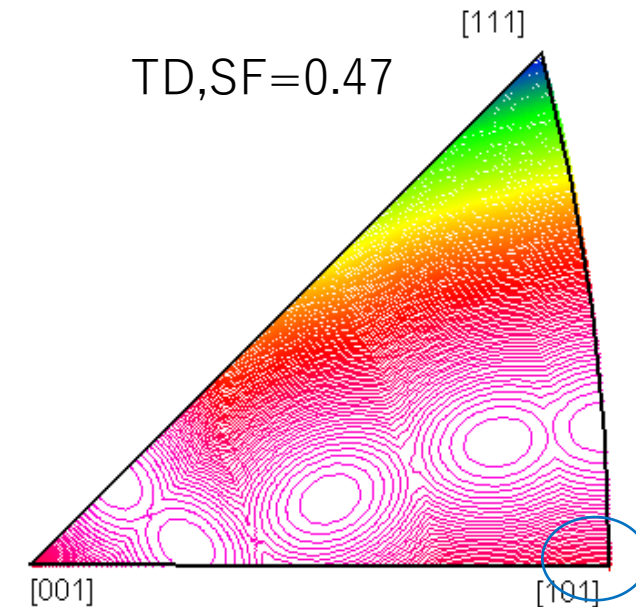
C:\CTR\work\SchmidLowBCC\Inverse.txt

RD, SF=0.32 [111]



C:\CTR\work\SchmidLowBCC\Inverse.txt

TD, SF=0.47 [111]



($\phi=35.26$, $\beta=45.0$) $Z=0.41$ -> [1,1,2]

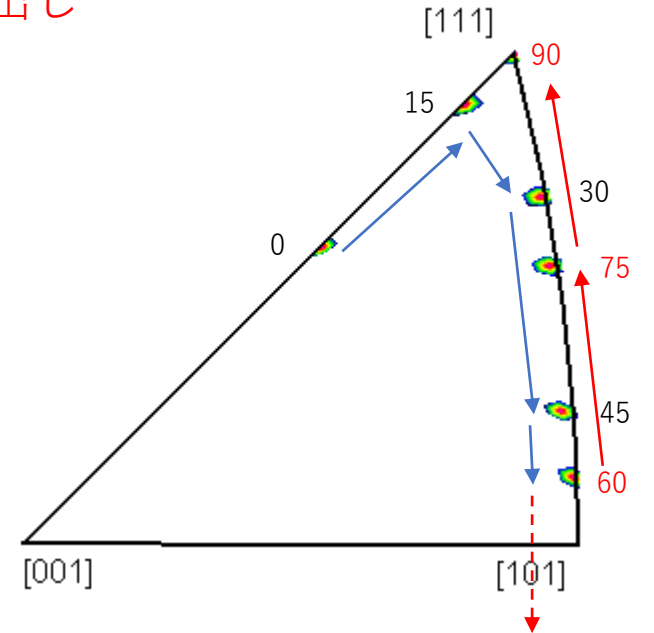
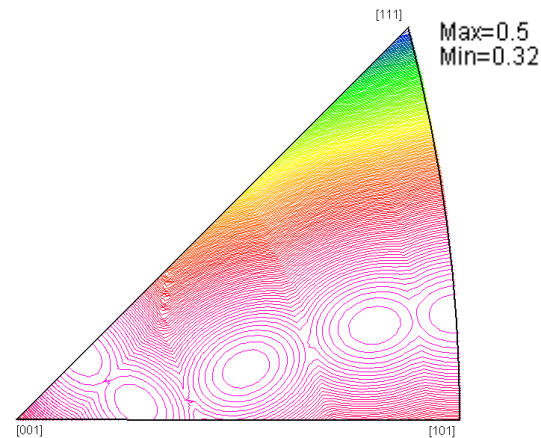
($\phi=54.74$, $\beta=45.0$) $Z=0.32$ -> [1,1,1]

($\phi=45.0$, $\beta=0.0$) $Z=0.47$ -> [1,0,1]

ND->RD(TD軸[-110]回転) の方位関係のまとめ

OBJFILE= {112}<-1-11> COMMENT AXIS=angle ND->RD DATA-NUMBER=7	Triclinic	Euler角度	Free	Euler角度	Inverse角度
0.0 0.4115	{1 1 2}<-1 -1 1>	(90.0 35.26 45.0)	{1 1 2}<-1 -1 1>	(90.0 35.26 45.0)	[1 1 2] --> [1 1 2] --> 35.26 45.0
15.0 0.3409	{6 6 7}<-3 -4 6>	(84.81 50.48 45.0)	{6 6 7}<-3 -4 6>	(84.81 50.48 45.0)	[6 6 7] --> [6 6 7] --> 50.48 45.0
30.0 0.4285	{3 3 2}<-1 -1 3>	(0.0 64.76 45.0)	{3 3 2}<-1 -1 3>	(0.0 64.76 45.0)	[3 3 2] --> [3 2 3] --> 50.24 33.69
45.0 0.5	{37 37 9}<-9 -9 74>	(90.0 80.24 45.0)	{37 37 9}<-9 -9 74>	(90.0 80.24 45.0)	[37 37 9] --> [37 9 37] --> 45.82 13.67
60.0 0.4939	{23 23 3}<3 3 -46>	(270.0 84.73 45.0)	{23 23 -3}<3 3 46>	(90.0 95.27 45.0)	[23 23 -3] --> [23 -3 23] --> 45.24 7.43
75.0 0.465	{17 17 9}<5 4 -17>	(272.23 69.48 45.0)	{17 17 -9}<5 4 17>	(87.77 110.52 45.0)	[17 17 -9] --> [17 -9 17] --> 48.53 27.9
90.0 0.3143	{1 1 1}<-2 1 1>	(150.0 54.74 45.0)	{1 1 -1}<1 1 2>	(90.0 125.26 45.0)	[1 1 1] --> [1 1 1] --> 54.74 45.0

ND->RDではeuler角度φが35,50,65,80,95,110,125と変化しているが **はみ出し**
 指数の整数化で(90 φ 45)付近の値が得られている



ND->TD(RD軸[-1-10]回転) の方位関係のまとめ

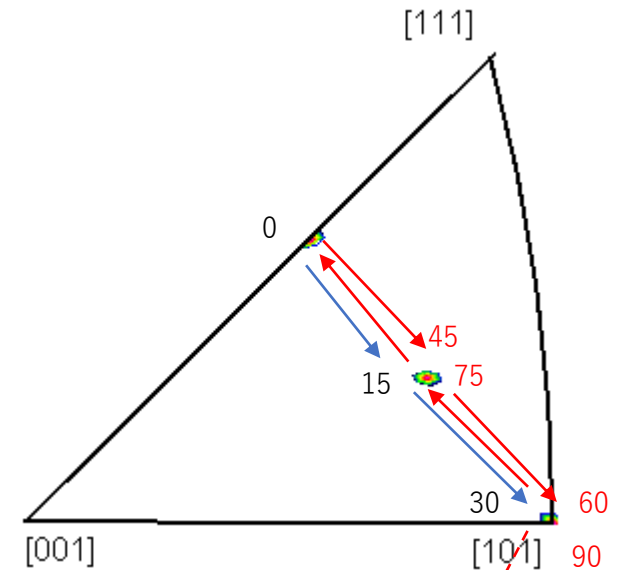
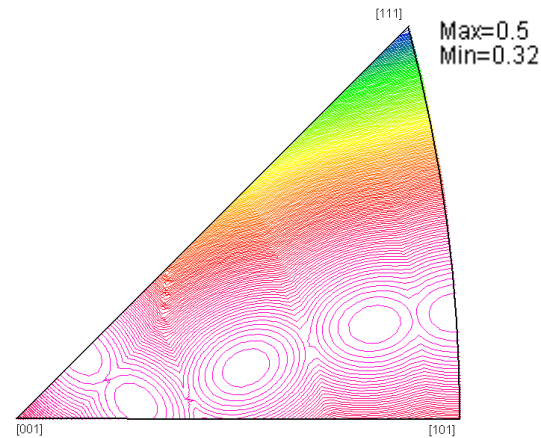
OBJFILE= {112}<-1-11>
 COMMENT
 AXIS=angle ND->TD
 DATA-NUMBER=7
 0.0 0.4115
 15.0 0.4967
 30.0 0.4714
 45.0 0.4967
 60.0 0.4115
 75.0 0.4967
 90.0 0.4714

Triclinic	Euler角度
{1 1 2}<-1 -1 1>	(90.0 35.26 45.0)
{19 7 26}<-1 -1 1>	(69.99 37.91 69.78)
{1 0 1}<-1 -1 1>	(54.74 45.0 90.0)
{26 7 19}<-1 1 1>	(134.96 54.79 74.93)
{2 1 1}<-1 1 1>	(140.77 65.91 63.43)
{26 19 7}<-1 1 1>	(143.78 77.74 53.84)
{1 1 0}<-1 1 1>	(144.74 90.0 45.0)

Free	Euler角度
{1 1 2}<-1 -1 1>	(90.0 35.26 45.0)
{19 7 26}<-1 -1 1>	(69.99 37.91 69.78)
{1 0 1}<-1 -1 1>	(54.74 45.0 90.0)
{26 -7 19}<-1 -1 1>	(44.96 54.79 105.07)
{2 -1 1}<-1 -1 1>	(39.23 65.91 16.57)
{26 -19 7}<-1 -1 1>	(36.22 77.74 126.16)
{1 -1 0}<-1 -1 1>	(35.26 90.0 135.0)

Inverse角度
[1 1 2] --> [1 1 2] --> 35.26 45.0
[19 7 26] --> [19 7 26] --> 37.91 20.22
[1 0 1] --> [1 0 1] --> 45.0 0.0
[26 -7 19] --> [19 7 26] --> 37.91 20.22
[2 -1 1] --> [1 1 2] --> 35.26 45.0
[26 -19 7] --> [19 7 26] --> 37.91 20.22
[1 -1 0] --> [1 0 1] --> 45.0 0.0

はみ出し



回転状況(ND->TD,Triclinic)

BCCSchmidFactorCalc3 3.12T[23/12/31] by CTR

File Help Text SlipProfile TD(RDRotate) abs(SF) Triclinic

InputFile(TXT)
LaboTex VolumeFraction(SumVFmode) { 1 1 2 } < -1 -1 1 > 100.0

Slip Systems
 {011}<11-1> {112}<11-1> {123}<11-1> FCC{111}<1-10> Stack Inverse

Data input
real [h k l] or [h k l] [h k l] [k u v w] phi1 PHI phi2 phi1<=90,PHI<=90

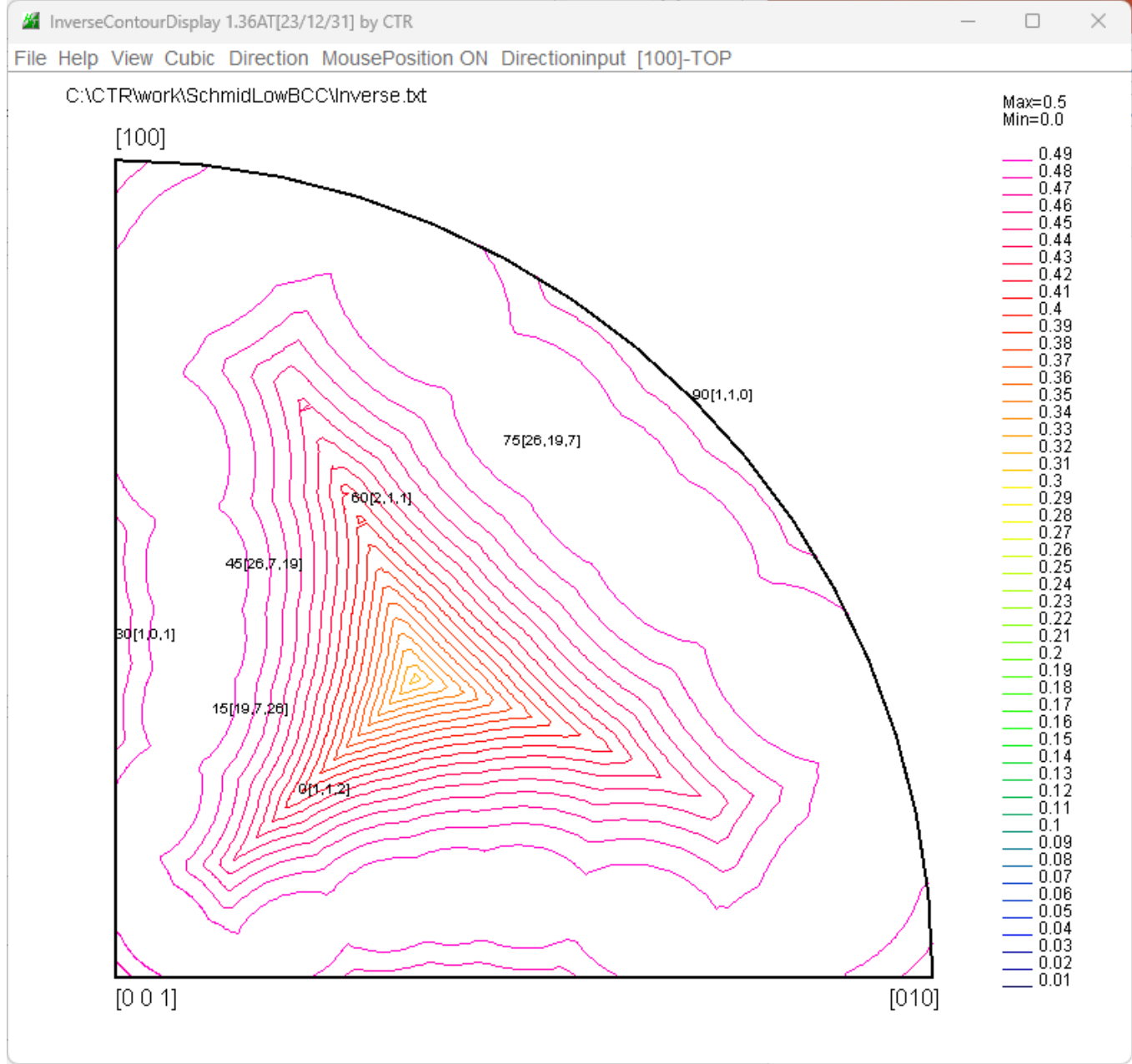
{ 1 1 2 } < -1 -1 1 > 100.0

AlongRD(X) 3 90 AlongTD(Y)<=0 2 0 AlongND(Z) 1 0 4 0

SchmidFactorProfile
 ND->TD all Step 15

AXISROTation HKLDouble

Clear
 SlipDisp
Schmidcalc
Symmetry SchmidCalc
SchmidFDisp



回転状況(ND->RD,Triclinic)

BCCSchmidFactorCalc3 3.12T[23/12/31] by CTR

File Help Text SlipProfile RD(TDRotate) abs(SF) Triclinic

InputFile(TXT)

LaboTex VolumeFraction(SumVFmode) [1 1 2]<-1 -1 1> 100.0

Disp DISP

Slip Systems

{011}<11-1> {112}<11-1> {123}<11-1> FCC{111}<11-10> Stack

Data input

real [h k l] or [h k l] [h k l]Ku v w> phi1 PHI phi2 phi1<=90,PHI<=90

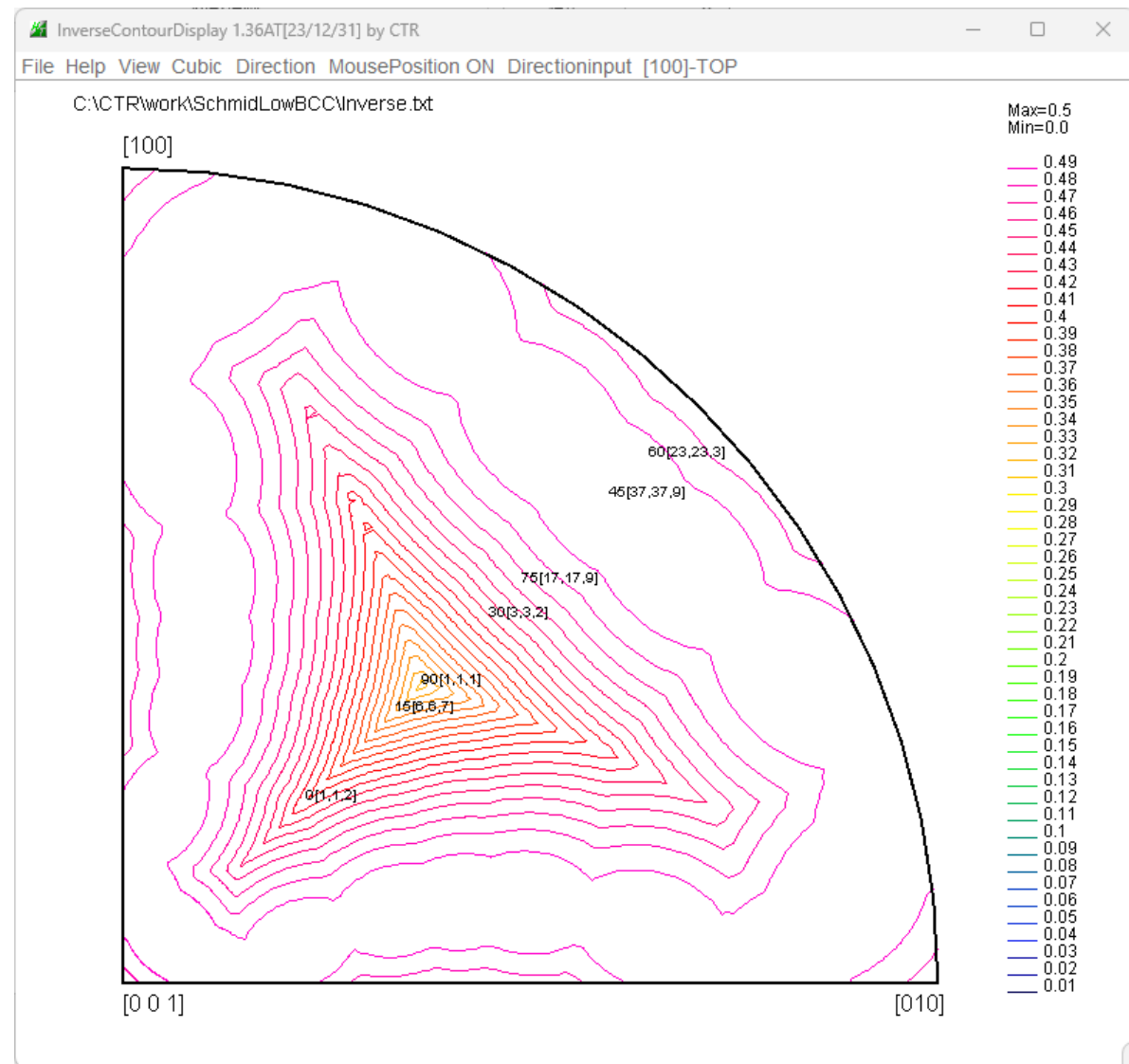
[1 1 2]<-1 -1 1> 100.0

AlongRD(X) 3 0 AlongTD(Y)<=0 2 -90 AlongND(Z) 1 0 4 0

SlipDisp

SchmidFactorProfile ND->RD all Step 15

AXISROTation HKLDouble



回転状況(RD->TD,Triclinic)

BCCSchmidFactorCalc3 3.12T[23/12/31] by CTR

File Help Text SlipProfile ND(NDRotate abs(SF) Triclinic

InputFile(TXT)
LaboTex VolumeFraction(SumVFmode) {1 1 2}<-1 -1 1> 100.0

Slip Systems
 {011}<11-1> {112}<11-1> {123}<11-1> FCC{111}<1-10> Stack Inverse

Data input
real [h k l] or [h k l] [h k l]Ku v w> phi1 PHI phi2 phi1<=90,PHI<=90

{1 1 2}<-1 -1 1> 100.0

AlongRD(X) 3 0 AlongTD(Y)<=0 2 0 AlongND(Z) 1 0 4 0

SchmidFactorProfile
 RD->TD all Step 15

AXSRotation HKLDouble

Clear
SlipDisp
Schmidcalc
Symmetry SchmidCalc
SchmidFDisp

