F2.1 Field Data in Cuts

Format

The file is generated by objects of the classses *Spherical Cut*, *Planar Cut*, *Surface Cut*, and *Cylindrical Cut*for storing field data in cuts. The file extension is *.cut*.

A cut consists of records of types 1, 2 and 3 as described below. If more than one cut is contained in a file all records must be repeated for each cut.

Record Contents Format

1 TEXT (characters)

TEXT - Record with identification text

2 V_INI, V_INC, V_NUM, C, ICOMP, ICUT, NCOMP (2 real numbers, one integer, 1 real number, 3 integers)

The V_ and C values are angles in degrees and their definition is controlled by the parameter ICUT:

V_INI - Initial value.
V_INC - Increment.
V_NUM - Number of values in cut.
C - Constant.
ICOMP - Polarisation control parameter.
ICUT - Control parameter of cut.
NCOMP - Number of field components.

For spherical cut:

The V_ and C values are angles in degrees and their definition is controlled by the parameter ICUT:

ICUT =1 A standard polar cut where ϕ is fixed (C) and θ is varying (V_)
ICUT =2 A conical cut where θ is fixed (C) and ϕ is varying (V_).

The field components F1, F2 are specified by the parameter ICOMP. For near fields the third component F3 always contains the radial E_ρ-component. F1 and F2 are for

ICOMP

=1 Linear E_θ and E_ϕ.
=2 Right hand and left hand circular (E_{rhc} and E_{lhc}).
=3 Linear E_{co} and E_{cx} (Ludwig's third definition).
=4 Linear along major and minor axes of the polarisation ellipse, E_{maj} and E_{min}.
=5 XPD fields: E_θ/E_ϕ and E_ϕ/E_θ.
=6 XPD fields: E_{rhc}/E_{lhc} and E_{lhc}/E_{rhc}.
=7 XPD fields: E_{co}/E_{cx} and E_{cx}/E_{co}.
=8 XPD fields: E_{maj}/E_{min} and E_{min}/E_{maj}.
=9 Total power $|\bar{E}|$ and $\sqrt{E_{rhc}/E_{lhc}}$.

If ICOMP is negative the above polarisation definitions apply according to ICOMP's absolute value, but the negative sign indicates that the polarisation is not defined in the cut coordinate system (attribute polarisation_modification has been sat to 'on' in the cut-defining object, see class *Spherical Cut*).

NCOMP – Number of field components.
=2 The file contains two field components for each point as specified above.
=3 When the field is a near field the file also contains the third radial component, E_ρ.

For planar cut and surface cut:

The definition of the V_ and C values is controlled by the parameter ICUT:

ICUT =1 A radial cut where ϕ is the fixed cut angle in degrees (C) and ρ is the varying distance in user defined units (V_).
ICUT =2 A circular cut where ρ is the fixed distance in user defined units (C) and ϕ is the varying angle in degrees (V_).

The field components F1, F2 are specified by the parameter ICOMP. The third component F3 always contains the z-component (E_z). For ICOMP:

=1 Linear E_ρ and E_ϕ.
=2 Right hand and left hand circular (E_{rhc}, E_{lhc})
=3 Linear components along x and y, E_{co} and E_{cx}.
=4 Linear along major and minor axes of the polarisation ellipse, E_{maj} and E_{min}, see below.
=5 XPD fields: E_ρ/E_ϕ and E_ϕ/E_ρ.
=6 XPD fields: E_{rhc}/E_{lhc} and E_{lhc}/E_{rhc}.
=7 XPD fields: E_{co}/E_{cx} and E_{cx}/E_{co}.
=8 XPD fields: E_{maj}/E_{min} and E_{min}/E_{maj}.
=9 Total power $|\bar{E}|$ and $\sqrt{E_{rhc}/E_{lhc}}$.

NCOMP – Number of field components.
=3 The file contains three field components for each point as specified above.

For cylindrical cut:

The definition of the V and C values are controlled by the parameter ICUT:

ICUT =1 An axial cut where ϕ is the fixed angle of the cut in degrees (C) and z is the varying distance in user defined units (V_).

ICUT =2 A circular cut where z is the fixed distance in user defined units (C) and ϕ is the varying angle in degrees (V_).

The field components F1, F2 are specified by the parameter ICOMP. The third component F3 always contains the radial component (E_ρ). ICOMP:

=2 Right and left hand components (E_{rhc},E_{lhc}). Based on the linear components as given in the next record.

=3 Linear E_ϕ, E_z.

=4 Linear along major and minor axes of the polarisation ellipse, E_{maj} and E_{min}, see below.

=6 XPD fields: E_{rhc}/E_{lhc} and E_{lhc}/E_{rhc}.

=7 XPD fields: E_z/E_ϕ and E_ϕ/E_z.

=8 XPD fields: E_{maj}/E_{min} and E_{min}/E_{maj}.

=9 Total power $\left|\bar{E}\right|$ and $\sqrt{E_{rhc}/E_{lhc}}$.

NCOMP - Number of field components.
=3 The file contains three field components for each point as specified above.

Record No. 3 and the following records contain the field values

If NCOMP=2

3 (F1(I),F2(I), I = 1, V_NUM) (4 real numbers on each record)

F1,F2 - Complex arrays containing the two components of the field for the I'th data point. V = V_INI + V_INC*(I-1)

If NCOMP=3

3 (F1(I),F2(I),F3(I), I = 1, V_NUM) (6 real numbers on each record)

F1,F2,F3 - Complex arrays containing the three components of the field for the I'th data point. V = V_INI + V_INC*(I-1)

---end of data file---

For ICOMP=1, 2, 3, 5, 6 or 7 F1, F2 (and optionally F3) contain the real and imaginary parts of the field in linear scale.

For ICOMP=4:

Real part of F1 is the major axis of the polarisation ellipse (linear scale).
Real part of F2 is the minor axis of the polarisation ellipse (linear scale).
Imaginary parts of F1 and F2 are zero.

For ICOMP=8

Real part of F1 is the major axis divided by the minor axis of the polarisation ellipse (linear scale).
Real part of F2 is the minor axis divided by the major axis of the polarisation ellipse (linear scale).
Imaginary parts of F1 and F2 are zero.

For ICOMP=9

Real part of F1 is the total power $\left|\bar{E}\right|$ of the field (linear scale)
Imaginary part of F1 is zero.
F2 is the complex square root of the ratio rhc/lhc. The phase of this value is the rotation angle of the polarisation ellipse.

Links

Field Data

List of File Formats

Ludwig's 3rd Definition of Polarization

Reference Section