**writeUfile\_2d.f**

This Fortran program writes a 2d ufile.

- The variables *c\_physicsTopics, c\_author, c\_source, prefname* and *profcomment* can only be modified in the source code. PRE.txt

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 c\_physicsTopics='Some topic’

 c\_author='F. Author'

 c\_source='experiment/simulation'

 prefname='DEV\_SHOT\_PRE.txt'

 profcomment='Measured/simulated data.'

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- The string *prefname* is the name of the input file and must end (both the string and the name of the file) with “PRE.txt”. The rest of the string is used for naming the output file.

 - The program can be compiled writing

[euler01.ciemat.es:~]$ ifort -warn all writeUfile\_2d.f -o writeUfile\_2d.x

- The input must have the following structure:

[euler01.ciemat.es:~]$ head DEV\_SHOT\_PRE.txt

nCols,procCode,STELL,SHOT,SHOT\_DATE,TIMEP,r\_ne,ne,r\_te,Te,r\_ti,Ti,,fact\_r\_ne,fact\_ne,fact\_r\_te,fact\_Te,fact\_r\_fact\_ti,Ti,

6,3,TJ-II,39063,20150423,1.094,100,100,90,90,100,100,0.192556,1E19,0.192556,1E3,0.192556,1E3

0.00000E+00,2.19835E+00,0.00000E+00,0.3143830599E+00,0.00000E+00,1.15084E-01

1.11111E-02,2.19701E+00,1.11111E-02,0.3144050288E+00,1.11111E-02,1.15092E-01

2.22222E-02,2.19299E+00,2.22222E-02,0.3144705647E+00,2.22222E-02,1.15116E-01

3.33333E-02,2.18631E+00,3.33333E-02,0.3145785576E+00,3.33333E-02,1.15156E-01

[...]

9.33333E-01,9.74409E-02,9.33333E-01,0.9047281193E-01,9.33333E-01,3.31187E-02

9.44444E-01,8.92096E-02,9.44444E-01,0.8598446193E-01,9.44444E-01,3.14757E-02

9.55556E-01,8.13017E-02,9.55556E-01,0.8156558297E-01,9.55556E-01,2.98581E-02

9.66667E-01,7.36974E-02,9.66667E-01,0.7721644358E-01,9.66667E-01,2.82661E-02

9.77778E-01,6.63881E-02,9.77778E-01,0.7293701357E-01,9.77778E-01,2.66995E-02

9.88889E-01,5.93760E-02,9.88889E-01,0.6872697950E-01,9.88889E-01,2.51584E-02

1.00000E+00,5.26724E-02,,,1.00000E+00,2.36425E-02

1.01111E+00,4.62955E-02,,,1.01111E+00,2.21514E-02

1.02222E+00,4.02690E-02,,,1.02222E+00,2.06848E-02

1.03333E+00,3.46191E-02,,,1.03333E+00,1.92423E-02

1.04444E+00,2.93728E-02,,,1.04444E+00,1.78232E-02

1.05556E+00,2.45555E-02,,,1.05556E+00,1.64271E-02

1.06667E+00,2.01887E-02,,,1.06667E+00,1.50531E-02

1.07778E+00,1.62883E-02,,,1.07778E+00,1.37006E-02

1.08889E+00,1.28628E-02,,,1.08889E+00,1.23689E-02

1.10000E+00,9.91215E-03,,,1.10000E+00,1.10570E-02

* nCols (6 in the example): twice the number of profiles: one colum for the radial coordinate, one for the plasma variable (different profiles may have different radial resolution).
* procCode (3): 0 (raw data), 1 (averaged), 2 (smoothed), 3 (averaged+smoothed)
* STELL (TJ-II): name of stellarator.
* SHOT (39063).
* SHOT\_DATE (20150423).
* TIMEP (1.094): time of measurement of profile in seconds.
* r\_ne,ne,r\_te,Te,r\_ti,Ti: number of points per profile.
	+ There hast to be *nCols* numbers, separed by comma.
	+ The number should be the same for e.g. r\_ne and ne.
	+ If it is larger for e.g. r\_ne than for r\_te, the corresponding column must be left empty, as in the last line of the example.
	+ THE NAMES r\_ne, etc CAN BE CHANGED BY THE USER in the input file.
* fact\_r\_ne,fact\_ne,fact\_r\_te,fact\_Te,fact\_r\_ti,fact\_Ti: scaling factor
	+ There hast to be *nCols* numbers, separed by comma.
	+ The scaling factor should be such that the radius is in meters, the densities in m^{-3} and the temperatures in eV.
* profiles:
	+ There hast to be *nCols* numbers, separed by comma.
	+ The number of lines have to fit with the numer of points per profile.

- Executing the program will write the ufile file (“DEV\_SHOT.dat” in the example) and will show its content in the STDOUT.

**readUfile.m**

This Matlab script reads a 2d ufile.

 - The name of the ufile must be input in variable *fname* before calling *readUfile.*

>> fname='sample.dat';

- Some information appears on screen together with one 2d plot per profile.

>> readUfile

39759 TJ-II 2 ;-SHOT # STELL DIMENSIONS- 26-APR-16

10-JUN-15 ;-SHOT DATE-

0 ;-NUMBER OF ASSOCIATED SCALAR QUANTITIES-

RHO ;-INDEPENDENT VARIABLE LABEL: X-

TIME [sec] ;-INDEPENDENT VARIABLE LABEL: Y-

HEAD\_COMMENT ;-DEPENDENT VARIABLE LABEL-

0 ;-PROC CODE- 0:RAW 1:AVG 2:SM 3:AVG+SM

1 ;-# OF X PTS-

1 ;-# OF Y PTS- X,Y,F(X,Y) DATA FOLLOW

 0.00000E+00

 0.00000E+00

 0.00000E+00

;----\_END-OF-DATA-----------------COMMENTS:-----------

physics topics: Density transport after pellet injection

author: J.L. Velasco

source: experiment

upDate: 26-APR-16

shot: 39759

time: 1.050

version:

comment: tj-ii\_39759.dat

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- The information is saved in a structure array.

>> profiles

profiles =

 r\_ne: [1x100 double]

 ne: [1x100 double]

 r\_te: [1x100 double]

 Te: [1x100 double]

 r\_ti: [1x100 double]

 Ti: [1x100 double]

- The fields correspond to the names used in the file.

- Unless otherwise indicated, densities are in m^{-3} and temperatures in eV.

- The profiles have *nx* radial points and are saved in a single time instant (at the moment this is enough for all the ufiles available in the ISHDB). E.g., in the example the ion core and edge temperature are, in eV:

>> profiles.Ti(1)

ans =

 75.0823

>> profiles.Ti(nx)

ans =

 1.5377