SPHERLSanal\Reference\Manual

1.0

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Contents

Chapter 1

Todo List

Member printHelp ()

need to updated, and revise help text to better describe the program. Some imporovements could include: -better describing the "-x" appended to the file name base -mention that some times it expects a file name base, while others it wants the full file name -mention file extensions and naming of output files i.e. what the outputfile for the radially averaged profile will be called -perhaps mention some of the additional scripts used to extend the functionallity of SPHERLSanal

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 4

Class Documentation

4.1 watchzone Struct Reference

Public Attributes

- std::vector< double > **vecdT**
- std::vector< double > **vecdU_ip1half**
- std::vector< double > **vecdU_im1half**
- std::vector< double > **vecdU0_ip1half**
- std::vector< double > **vecdU0_im1half**
- std::vector< double > **vecdQ0**
- std::vector< double > **vecdV_jp1half**
- std::vector< double > **vecdV_jm1half**
- std::vector< double > **vecdQ1**
- std::vector< double > **vecdW_kp1half**
- std::vector< double > **vecdW_km1half**
- std::vector< double > **vecdQ2**
- std::vector< double > **vecdR_ip1half**
- std::vector< double > **vecdR_im1half**
- std::vector< double > **vecdDensity**
- std::vector< double > **vecdDensityAve**
- std::vector< double > **vecdE**
- std::vector< double > **vecdP**
- std::vector< double > **vecdTemp**
- std::vector< double > **vecdDelM_r_t0**
- std::vector< double > **vecdDelM_r**
- std::vector< double > **vecdErrorDelM_r**

The documentation for this struct was generated from the following file:

- main.h

Chapter 5

File Documentation

5.1 main.cpp File Reference

```
#include "main.h" #include <math.h> #include <iomanip> ×
#include "eos.h" #include "mfhdf.h"
```

Functions

- int **main** (int argc, char ∗argv[])
- void printHelp ()
- void **convertCollBinToAscii** (std::string sFileName)
- void **convertDistBinToAscii** (std::string sFileNameBase)
- void **combineBinFiles** (std::string sFileNameBase)
- bool **bFileExists** (std::string strFilename)
- void **convertCollAsciiToBin** (std::string sFileName)
- void **makeRadialProFromColBin** (std::string sFileName)
- void **fpSignalHandler** (int nSig)
- void **make2DSlice** (std::string sFileName, int nPlane, int nPlaneIndex)
- watchzone **readInWatchZone** (std::string sFileName)
- void **convertBinToLNA** (std::string sFileName)
- double **dCalRhoAve3D** (double ∗∗∗∗dGrid, int nI, int nStartY, int nEndY, int n-StartZ, int nEndZ)
- double dCalRhoAve2D (double ∗∗∗∗dGrid, int nI, int nStartY, int nEndY, int n-StartZ, int nEndZ)
- void computeFourierTransFromList (std::string sInFileName, std::string sOutFile-Name)
- void **computeFourierTrans** (std::string sInFileName, std::string sOutFileName)
- void convertBinToHDF4 (std::string sFileName)

5.1.1 Detailed Description

This code is used to manipulate the outputfiles generated by SHPERLS.

5.1.2 Function Documentation

5.1.2.1 void computeFourierTransFromList (std::string *sInFileName,* std::string *sOutFileName*)

Calculates a volume weighted average density given the grid varibles, dGrid and the radial index, nI, the start and stop indices in the Y and Z direction. For the 2D case.

5.1.2.2 void convertBinToHDF4 (std::string *sFileName*)

converts a collected binary file to an hdf file

References nC, nD, nDM, nE, nGamma, nKappa, nKE, nL_con, nL_rad, nM, nP, nPhi, nQ, nR, nT, nTheta, nU, nU0, nV, and nW.

5.1.2.3 double dCalRhoAve2D (double **** *dGrid,* int *nI,* int *nStartY,* int *nEndY,* int *nStartZ,* int *nEndZ*)

Calculates a volume weighted average density given the grid varibles, dGrid and the radial index, nI, the start and stop indices in the Y and Z direction. For the 3D case.

References nD, nR, and nTheta.

5.1.2.4 void printHelp ( )

Todo need to updated, and revise help text to better describe the program. Some imporovements could include: -better describing the "-x" appended to the file name base -mention that some times it expects a file name base, while others it wants the full file name -mention file extensions and naming of output files i.e. what the outputfile for the radially averaged profile will be called -perhaps mention some of the additional scripts used to extend the functionallity of SPHERLSanal

5.2 main.h File Reference

```
#include "../../config.h"  #include <fftw3.h>  #include
"mfhdf.h" #include <cstdlib> #include <iostream> #include
<fstream> #include <sstream> #include <string> #include
<exception>  #include <sys/stat.h>  #include <cmath> ×
#include "exception2.h"#include <csignal>#include <fenv.-
h> #include <limits> #include <vector>
```

Classes

- struct watchzone

Functions

- void **convertDistBinToAscii** (std::string sFileNameBase)
- void **combineBinFiles** (std::string sFileNameBase)
- void **convertCollBinToAscii** (std::string sFileName)
- void **convertCollAsciiToBin** (std::string sFileName)
- void **makeRadialProFromColBin** (std::string sFileName)
- void printHelp ()
- bool **bFileExists** (std::string strFilename)
- void **fpSignalHandler** (int nSig)
- void **make2DSlice** (std::string sFileName, int nPlane, int nPlaneIndex)
- void **convertBinToLNA** (std::string sFileName)
- double **dCalRhoAve3D** (double ****dGrid, int nI, int nStartY, int nEndY, int nStartZ, int nEndZ)
- double dCalRhoAve2D (double ****dGrid, int nI, int nStartY, int nEndY, int nStartZ, int nEndZ)
- void computeFourierTransFromList (std::string sInFileName, std::string sOutFileName)
- void **computeFourierTrans** (std::string sInFileName, std::string sOutFileName)
- void convertBinToHDF4 (std::string sFileName)

Variables

- int nM
- int nTheta
- int nPhi
- int nDM
- int nR
- int nD
- int nU
- int nU0
- int nV
- int nW
- int nE
- int nT
- int nP
- int nQ
- int nKappa
- int nGamma
- int nL_rad
- int nL_con
- int nKE
- int nC
- int nF_con
- int nPrecisionAscii = 16
- bool bScientific = true

- const double dPi = 3.14159265358979323846264338327 95
- const double dSigma = 5.67040040E-5
- const double dLSun = 3.839e33
- const int nDumpFileVersion = 1
- bool bExtraInfoInProfile = false
- std::string sEOSFile = ""

5.2.1 Detailed Description

Header file for main.cpp.

5.2.2 Function Documentation

5.2.2.1 void computeFourierTransFromList (std::string *sInFileName,* std::string *sOutFileName*)

Calculates a volume weighted average density given the grid varibles, dGrid and the radial index, nI, the start and stop indices in the Y and Z direction. For the 2D case.

5.2.2.2 void convertBinToHDF4 (std::string *sFileName*)

converts a collected binary file to an hdf file

References nC, nD, nDM, nE, nGamma, nKappa, nKE, nL_con, nL_rad, nM, nP, nPhi, nQ, nR, nT, nTheta, nU, nU0, nV, and nW.

5.2.2.3 double dCalRhoAve2D (double **** *dGrid,* int *nI,* int *nStartY,* int *nEndY,* int *nStartZ,* int *nEndZ*)

Calculates a volume weighted average density given the grid varibles, dGrid and the radial index, nI, the start and stop indices in the Y and Z direction. For the 3D case.

References nD, nR, and nTheta.

5.2.2.4 void printHelp ( )

Todo need to updated, and revise help text to better describe the program. Some imporovements could include: -better describing the "-x" appended to the file name base -mention that some times it expects a file name base, while others it wants the full file name -mention file extensions and naming of output files i.e. what the outputfile for the radially averaged profile will be called -perhaps mention some of the additional scripts used to extend the functionallity of SPHERLSanal

5.2.3 Variable Documentation

5.2.3.1 bool bExtraInfoInProfile = false

If true include extra information in radial profile about equation of state and opacity derivatives.

5.2.3.2 bool bScientific = true

Output ascii files in scientific format

5.2.3.3 const double dLSun = 3.839e33

Luminosity of the sun in erg/s

5.2.3.4 const double dPi = 3.14159265358979323846264338327 95

Pi

5.2.3.5 const double dSigma = 5.67040040E-5

Boltzman constant

5.2.3.6 int nC

Index of the sound speed.

Referenced by convertBinToHDF4().

5.2.3.7 int nD

Index of ρ, density, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4(), and dCalRhoAve2D().

5.2.3.8 int nDM

Index of δM in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.9 const int nDumpFileVersion = 1

Version of the dump file supported

5.2.3.10 int nE

Index of E, internal energy, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.11 int nF_con

Index of the convective luminosity.

5.2.3.12 int nGamma

Index of the adiabatic gamma.

Referenced by convertBinToHDF4().

5.2.3.13 int nKappa

Index of the opacity in grids.

Referenced by convertBinToHDF4().

5.2.3.14 int nKE

Index of the Kinetic energy.

Referenced by convertBinToHDF4().

5.2.3.15 int nL_con

Index of the Convective Luminosity.

Referenced by convertBinToHDF4().

5.2.3.16 int nL_rad

Index of the Radiative Luminosity.

Referenced by convertBinToHDF4().

5.2.3.17 int nM

Index of M_r in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.18 int nP

Index of P, pressure

Referenced by convertBinToHDF4().

5.2.3.19 int nPhi

Index of ϕ in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.20 int nPrecisionAscii = 16

Set presicsion of ascii output

5.2.3.21 int nQ

Index of the artificial viscosity in grids.

Referenced by convertBinToHDF4().

5.2.3.22 int nR

Index of R, radius, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4(), and dCalRhoAve2D().

5.2.3.23 int nT

Index of T, temperature, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.24 int nTheta

Index of θ in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4(), and dCalRhoAve2D().

5.2.3.25 int nU

Index of u,radial velocity, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.26 int nU0

Index of u_0, radial grid velocity, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.27 int nV

Index of v, theta velocity in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.28 int nW

Index of w, phi velocity, in grids, This should be the same as that used in SPHERLS defined in global.h

Referenced by convertBinToHDF4().

5.2.3.29 std::string sEOSFile = ""

path to an equation of state file, used for overriding the path/eos file in the model files.

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