The Center for Astrophysical Thermonuclear Flashes
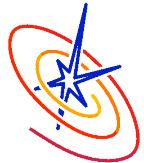
Runtime Environment

Flash Tutorial

June 23, 2009

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ASC™

"FLASH Environment"

❑ Runtime Parameters Rules of Thumb

❑ Config files

❑ Setup Command Line

❑ Parameter Files

❑ Tips

Rules of thumb

❑ In FLASH, the rule is that the last declared instance wins. If a parameter is set in multiple places the last set example wins.

  ❑ For example: if a default value is given for a runtime parameter, and is then set in a parfile, the parfile version "wins."

❑ The order parameters are set in are Config files and then may be overridden in a parfile

❑ On a restart, parameters are reset from appropriate default values and from the current parfile being used.

Config file example

```
# Configuration File for setup Stirring Turbulance
REQUIRES Driver
REQUIRES physics/sourceTerms/Stir/StirMain
REQUIRES physics/Eos
REQUIRES physics/Hydro
REQUIRES Grid
REQUESTS IO

# include IO routine only if IO unit included
LINKIF IO_writeIntegralQuantities.F90 IO/IOMain
LINKIF IO_writeUserArray.F90 IO/IOMain/hdf5/parallel
LINKIF IO_readUserArray.F90 IO/IOMain/hdf5/parallel

LINKIF IO_writeUserArray.F90.pnetcdf IO/IOMain/pnetcdf
LINKIF IO_readUserArray.F90.pnetcdf IO/IOMain/pnetcdf


D      c_ambient       reference sound speed
D      rho_ambient     reference density
D      mach            reference mach number
PARAMETER c_ambient     REAL    1.e0
PARAMETER rho_ambient    REAL    1.e0
PARAMETER mach          REAL    0.3

GRIDVAR mvrt

USESETUPVARS nDim
IF nDim <> 3
   SETUPERROR At present Stir turb works correctly only in 3D.  Use ./setup StirTurb -3d blah blah
ENDIF
```

Required Units

Alternate local IO routines

Runtime parameters and documentation

Additional scratch grid variable

Enforce geometry or other conditions

The ASC/Alliances Center for Astrophysical Thermonuclear Flashes
The University of Chicago

Config File Tips

❑ Comments are supported, use them!

  ❑ Helps prevent orphan parameters

❑ Keep the parameter space clean.

  ❑ Do not keep old parameters around that are no longer used

❑ Use the least aggressive request for an implementation

  ❑ Consider REQUESTS instead of REQUIRES

  ❑ Use REQUIRES with the most general level possible (i.e. Grid /GridMain rather than a specific implementation)

❑ Set default values and constraints

  ❑ The earlier an error is detected, the easier it is to fix.

❑ Use descriptive names for variables

Parameter Input File - flash.par

❑ File is read by FLASH at initialization

❑ Defaults are set in Config files and any value in the flash.par overides the Config values

❑ Parameter MUST be declared in Config file, otherwise FLASH ignores it in flash.par

❑ Controls parameters for all units (examples below)
  ❑ Grid parameters - lrefine_max, lrefine_min, geometry
  ❑ Physics parameters - flame_speed
  ❑ I/O parameters - restart, checkpointFileNumber

Parameter Files Tips

❑ Writing a good parameter file starts with good Config files.

❑ Comments are supported here as well, use them.

❑ On the same note, keep similar unit parameters together

❑ Undeclared runtime parameters are ignored

    ❑ For example: If a parfile has uniform grid runtime parameters in it, and is run using Paramesh, the UG only parameters will be ignored.

❑ Values here override values from the Config files. They can also be changed on a restart.

❑ This file is only read on a run start or during a restart, it is ignored for the rest of the run.
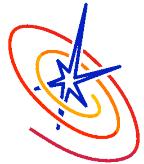
Useful Parameters

□ Driver

□ zInitial, zFinal -- Control the simulation's end via a cosmological redshift

□ eachProcWritesOwnAbortLog -- If a processor calls Driver_abortFlash, it will attempt to write out it's own error logfile

□ IO

□ stats_file -- rename the .dat file

□ useCollectiveHDF5 -- turns on HDF5's collective mode for I/O operations

□ checkpointFileIntervalZ -- output a checkpoint file after a certain change in the Cosmological redshift

Useful Parameters

- Logfile
    - log_file -- renames the logfile
    - run_comment -- add in commentary on a given run

- Grid
    - convertToConsvdInMeshInterp -- replaces "convertToConsvdForMeshCalls" that was in Paramesh 2. Available when using Paramesh 4.0 or Paramesh 4dev

- General
    - use*Unitname* -- Some units can be turned on or off at runtime, if nothing else, make sure this is set correctly in the parfile

❑ More Parameters can be found on the Flash Code Support website at http://flash.uchicago.edu/website/codesupport/ under "Runtinme Parameter Descriptions"