Adaptive Radiative Transfer Innovations for Sub-millimeter Telescopes (ARTIST)
Table format

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About

ARTIST Table is a machine readable table to store physical variables *and* the corresponding spatial grid for the ARTIST package.

File name

Each variable is stored in a separate file and the file name should end with a `.ARTIST.tab` extension. Although there is no strict rule for the file names (apart from the extension), the ARTIST GUI applies the following convention. If the physical variable is imported from another code, the file name of the external code is used and the `.ARTIST.tab` extension is added. E.g. the table file for the dust temperature imported from the 2D radiative transfer code RADMC will have the name `dusttemp_final.dat.ARTIST.tab`. If the variable is not imported (but generated otherwise) the file name contain the name of the variable it contains. In this case the variable names will be identical to the list of function names used in Lime models (e.g. density, temperature, bmag, etc.).

File format

The ARTIST Table file can be divided to three sections: header, grid and data, which are separated by empty lines. The file content can be summarized as follows;

Line #	Content
1	Variable name
2	Grid style
3	Grid type
4	Cell- or corner-centered grid
5	Number of grid points in each dimension
6	Emtpy line
7...N_{Grid}+7	Spatial grid
N_{Grid}+8	Empty line
N_{Grid}+9...	Variable values

Variable name: Name of the variable stored in the file (e.g. density, temperature, etc). The list of variable names is identical to the list of function names defined in Lime models.

Grid style: 0-Regular grids, 1-Irregular grids

Grid type: For regular grids: 0-Cartesian, 1-Cylindrical, 2-Spherical. For irregular grids: 0-AMR, 1-Delaunay

Cell- or corner-centered grid: 0-Cell-centered, 1-Corner-centered

Nr of grid points: For regular grids: three numbers specifying the number of grid points in each dimension. Having 0 for a specific dimension means that that dimension is not active. E.g. spherical symmetric grids should have 0 for the second and the third dimensions. For irregular grids: only one single number should be given, the total number of grid points in the grid.

Spatial grid: List of grid values. For regular grids: the list of grid points for each dimension should be given in a single column format, with only a single number in a row. In other words the grid for the three axes/dimensions should be given one after another. The order of dimensions is: Cartesian: x-y-z, Cylindrical: r-z-phi, Spherical: r,theta,phi. For irregular grids; each row in the list should contain three numbers, the three dimensional coordinates of the grid points.

Variable values: Single column list of variable values that are read/written by three nested loops (for the three dimensions) in the same order as the spatial grid. I.e. for regular cartesian grids the outermost loop is in the x-index while the innermost loop is in the z-index.

NOTE: For cell centered grids (when the grid describes cell interfaces) in the 5th line the *number of grid points* should be given, which is higher (by one) than the number of data values in each dimension.
NOTE: Currently only regular grids are supported, the exact format for the irregular grids is currently experimental but will be fixed in the future.