Sedona6 User's Guide

June 13, 2016

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2 Getting Started

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2.2 Building the Code

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3 Input Data

Atomic data format

4 Model Parameters

Parameters are in the param.lua file. This is lua script, where you can specify variables and even functions inside the param file.

Defaults for all parameters are given in a defaults.lua file.

Time stepping parameters

tstep_max_steps	integer number of time steps to take before exiting before stopping
tstep_time_stop	stop time (in seconds)
tstep_max_dt	maximum size of a timestep (in seconds)
tstep_min_dt	minimum size of a timestep (in seconds)
tstep_max_delta	maximum fractional size of a timestep (multiply this by the current time to get the maximum timestep).

Transport parameters

transport_nu_grid	frequency grid to calculate opacities/emissivites. In the format of nu_start, nu_stop, nu_delta
transport_radiative_equilibrium	= 0 or 1. If 1, determine gas temperature after each time step from radiative equilibrium, i.e., heating equals radiative cooling
transport_steady_iterate	= integer. Do not step in time, rather iterate the radiation transport (in steady state) the number of times given.

5 Output

Spectrum files:

Ray files:

Grid files:

Level.hdf5 Files: These files continue detailed information about the ionization and excitation state for all species.

6 Test Problems

6.1 Core Into Vacuum

Setup: A spherical inner boundary emits blackbody radiation into an extremely low density medium, with optical depth so low it is essentially vacuum.

Test #1 - *Emergent Spectrum*: This should be a blackbody at the input inner core temperature. Tests general sampling of

Test #2 - *Radiation Temperature Structure*:. The radiation field outside a spherical emitter should be given by the dilution factor

$$J = \frac{1}{2}\left[1 - \sqrt{1 - R_0^2/r^2}\right] \tag{1}$$

Test #3 - *Non-LTE level populations*: