1 The region of interest of is split into a grid of voxels of size  $\Delta x \Delta y \Delta z$ . Each voxel is allowed to vary in density and magnetic field



2 The 3D grid is then subdivided into three resolutions based on the cosmic ray energy (high resolution = low energy CR). For every time step:



**3** The time step is calculate based on the rate of diffusion.



4 Electrons are injected by the source into the centre of the grid.



 ${f 5b}$  The cosmic ray energy distribution at  $t_i$  is found by calculating the net transfer of cosmic rays from neighbouring voxels



 $\begin{aligned} \textbf{5c} & \text{Cosmic rays are injected by the} \\ & \text{source. The current cosmic ray energy} \\ & \text{distribution becomes the old CR} \\ & \text{energy distribution at} \\ & t_i + \Delta t \end{aligned}$ 

6 When the age of the system is reached, the multiwavelength SED along the light of sight (z) is calculated at position xy. The SED and cosmic ray energy distribution is then written as FITS cubes