Darksun

A first code for neutrinos coming from DM annihilation in the Sun

- take the initial neutrino flux from DM annihilation in the Sun from [1] and read it in with the `fluxl.flux_pion` function from `stuff_neuprod.h`
  not clear to me if this is neutrino or antineutrino flux
- the initial flux depends on the DM annihilation channel (the numbers (1 to 28) refer to $DM + DM \to e_L + e_L-, e_R + e_R-, e + e-, \mu_L + \mu_L-, \mu_R + \mu_R-, \mu + \mu-, \tau_L + \tau_L-, \tau_R + \tau_R-, \tau + \tau-, qq, cc, bb, tt, W_L + W_L-, W_T + W_T-, W + W-, Z_L + Z_L-, Z_T + Z_T-, Z + Z-, gg, \gamma\gamma, hh, \nu_e + \nu_e, \nu_\mu + \nu_\mu, \nu_\tau + \nu_\tau, VV \to 4e, VV \to 4\mu, VV \to 4\tau$), and the ratio DM mass/energy
  You need to change the path to the initial neutrino flux in `stuff_neuprod.h`!!!
- notice that we need to set the initial neutrino energy in the code, so we need to give also a DM mass in GeV
- start the propagation in the Sun with the nuSQuIDS sun code, given the number of neutrinos **in principle we can use 4 neutrinos** and the mixing parameters
- use the neutrino flux after the propagation through the Sun as initial flux for the propagation through vacuum with the nuSQuIDS vacuum code
- I fixed the Sun-Earth distance to the average distance
- use the neutrino flux after the propagation through the vacuum as initial flux for the propagation through the earth
- I used the nuSQuIDS `earth_atm` code for the propagation through the earth (which only depends on the zenith angle) but I would prefer to use `nuSQUIDSAtm` code which has a grid of energies and zenith angles instead of just one value of zenith angle and energy
- output the final neutrino flux in a HDF5 file or in a text file
- the `a` function in `sunpos.h` gives the the zenith angle of the Sun at a given position and date as (day, month, year) used in the `elapsedtime` function **note that the date needs to be after 1.1.2013**, the position needs to be given as degree North, degrees East (degrees South=-degree North, degrees West=-degrees East), this function is based on the approach from [2]
  I don't use this function right now

To do

- replace the earthatm function with the nusquidsatm function
- use Josu's code to get the correct distances in the vacuum/earth
- right now I fix the initial neutrino energy in the beginning and assume that the neutrinos don't loose energy during the propagation, this might not be true

References

[1] M. Cirelli *et al.*, JCAP **1103** (2011) 051 Erratum: [JCAP **1210** (2012) E01] doi:10.1088/1475-7516/2012/10/E01, 10.1088/1475-7516/2011/03/051 [arXiv:1012.4515 [hep-ph]].

[2] A. Jenkins, arXiV:1208.1043