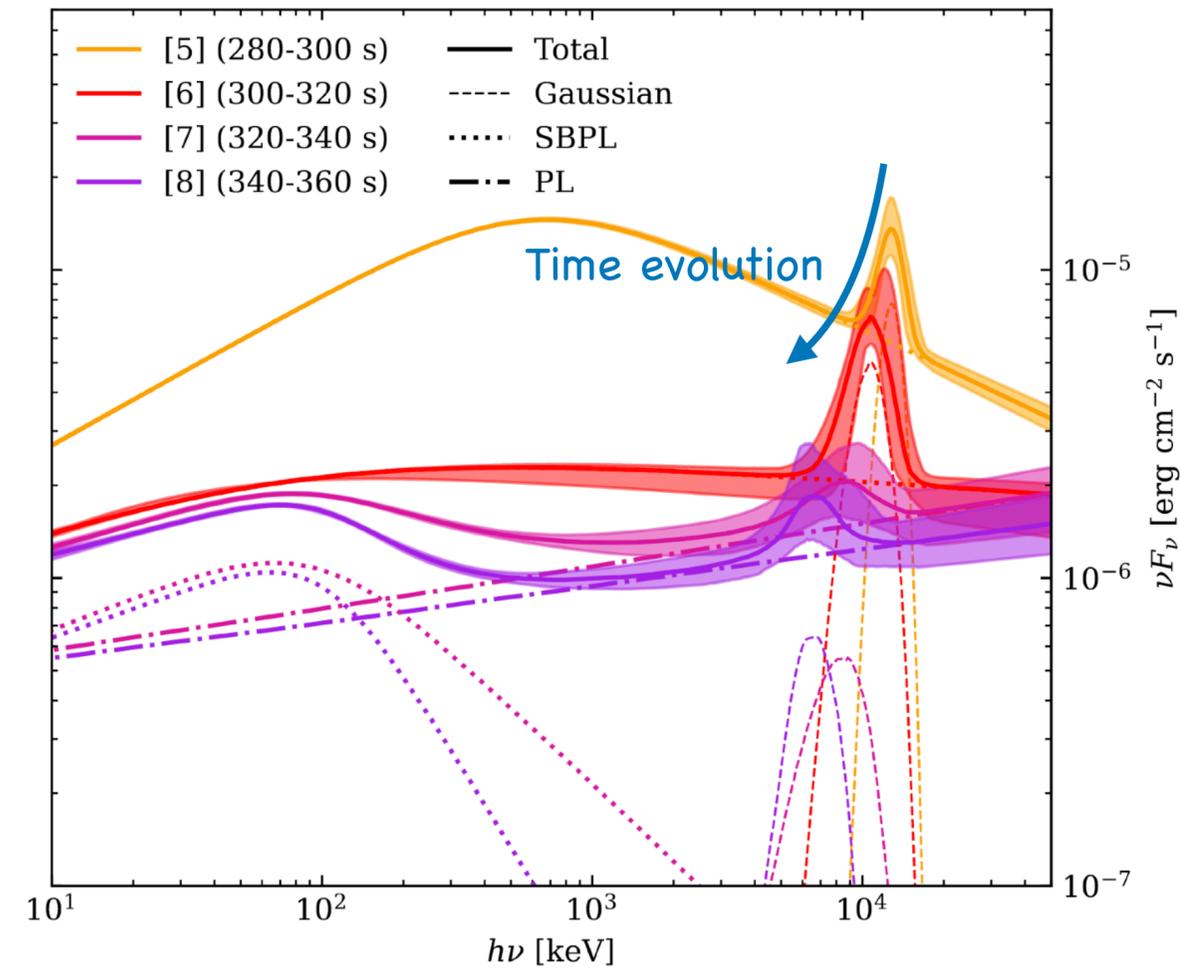
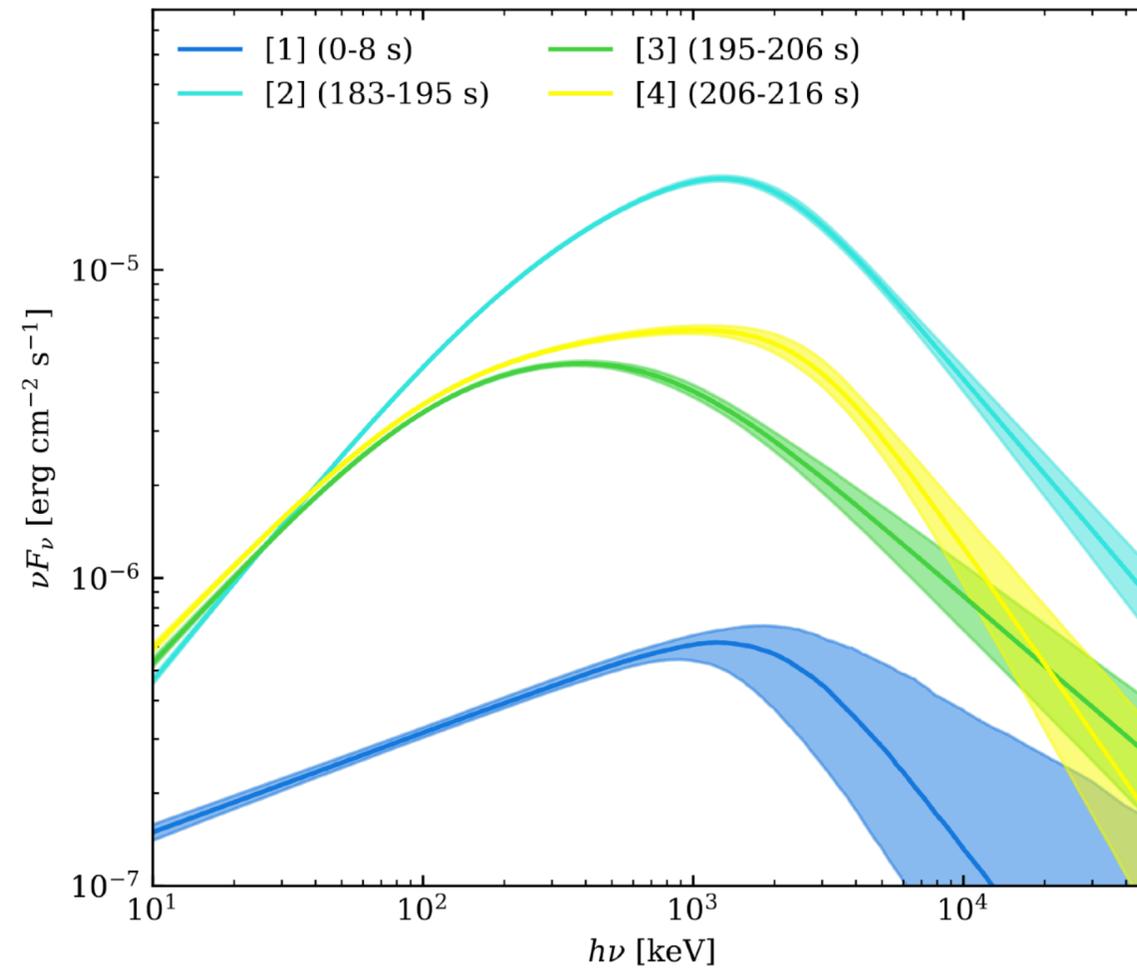
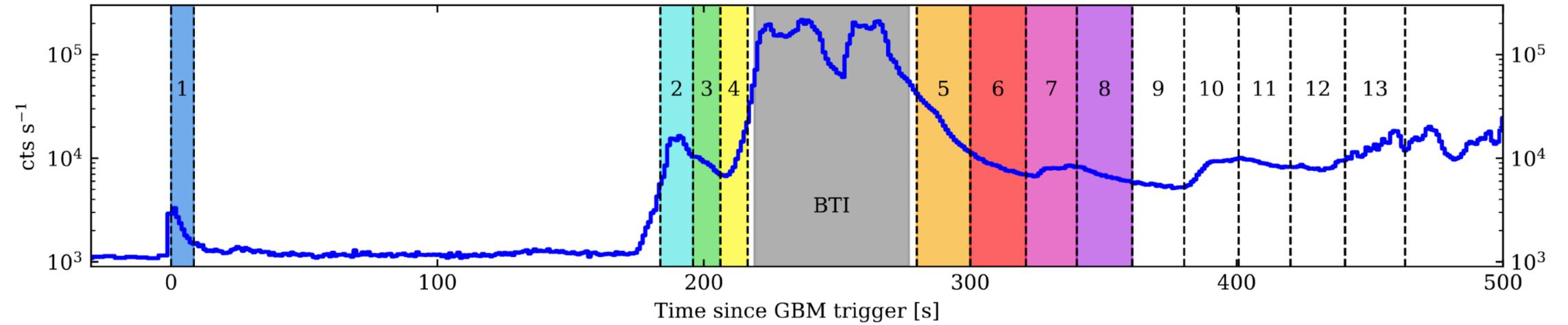


The MeV line in GRB221009A A.K.A. the brightest of all time

3 time intervals :

- No line
- Bad Time Interval
- ~10 MeV residuals



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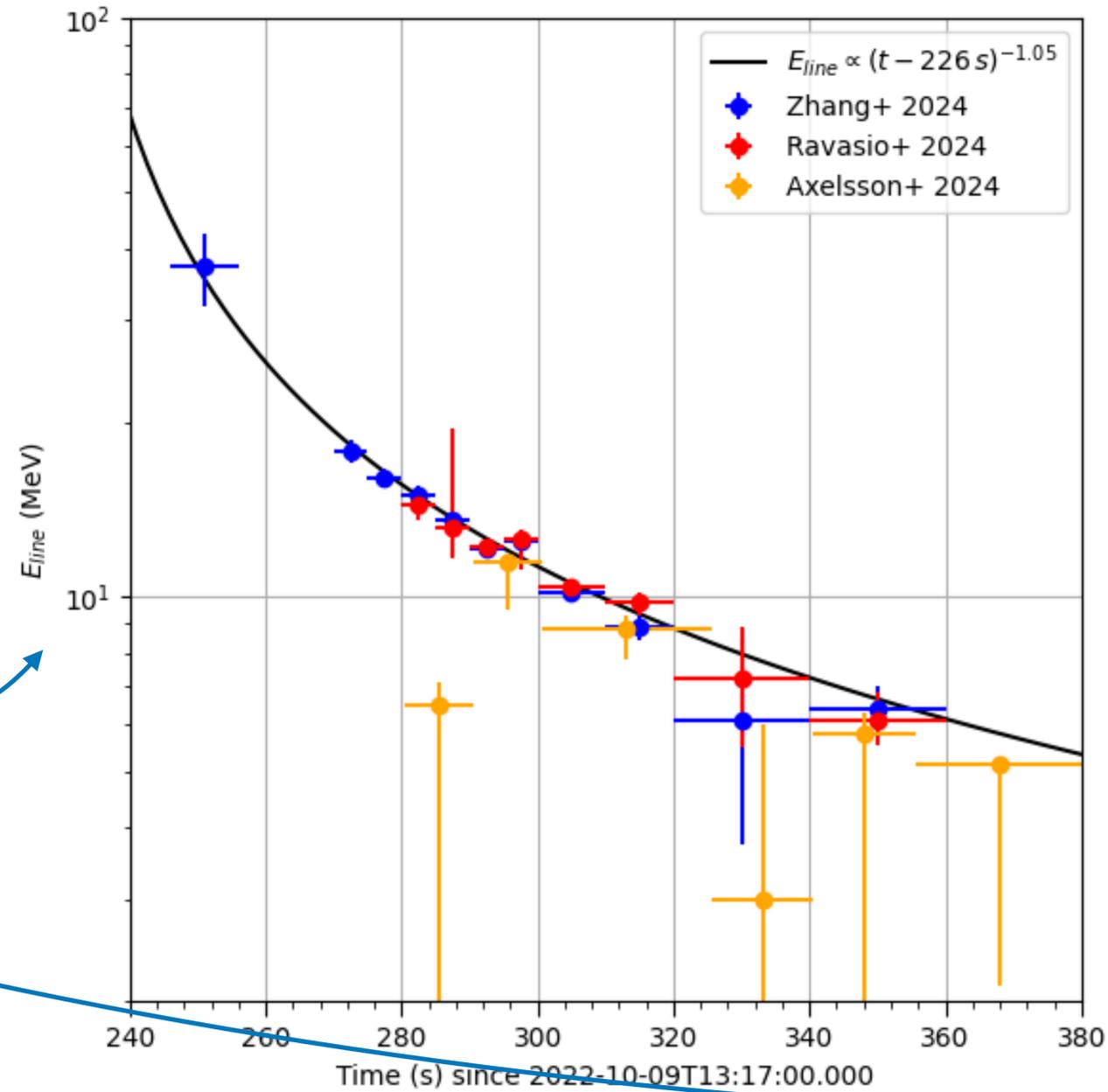
Line properties :

- Evolve with time

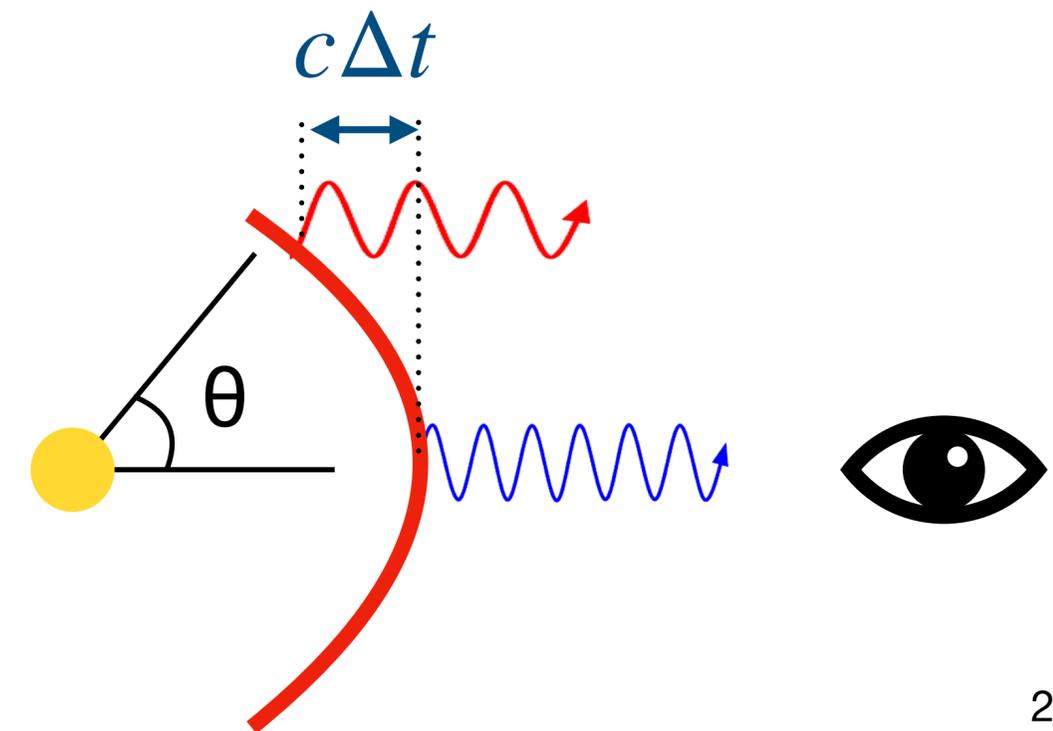
- $E_{line} \propto (t - t_0)^{-1}$

⇒ High Latitude Emission ?

Electron-positron pairs annihilation line blue-shifted ?

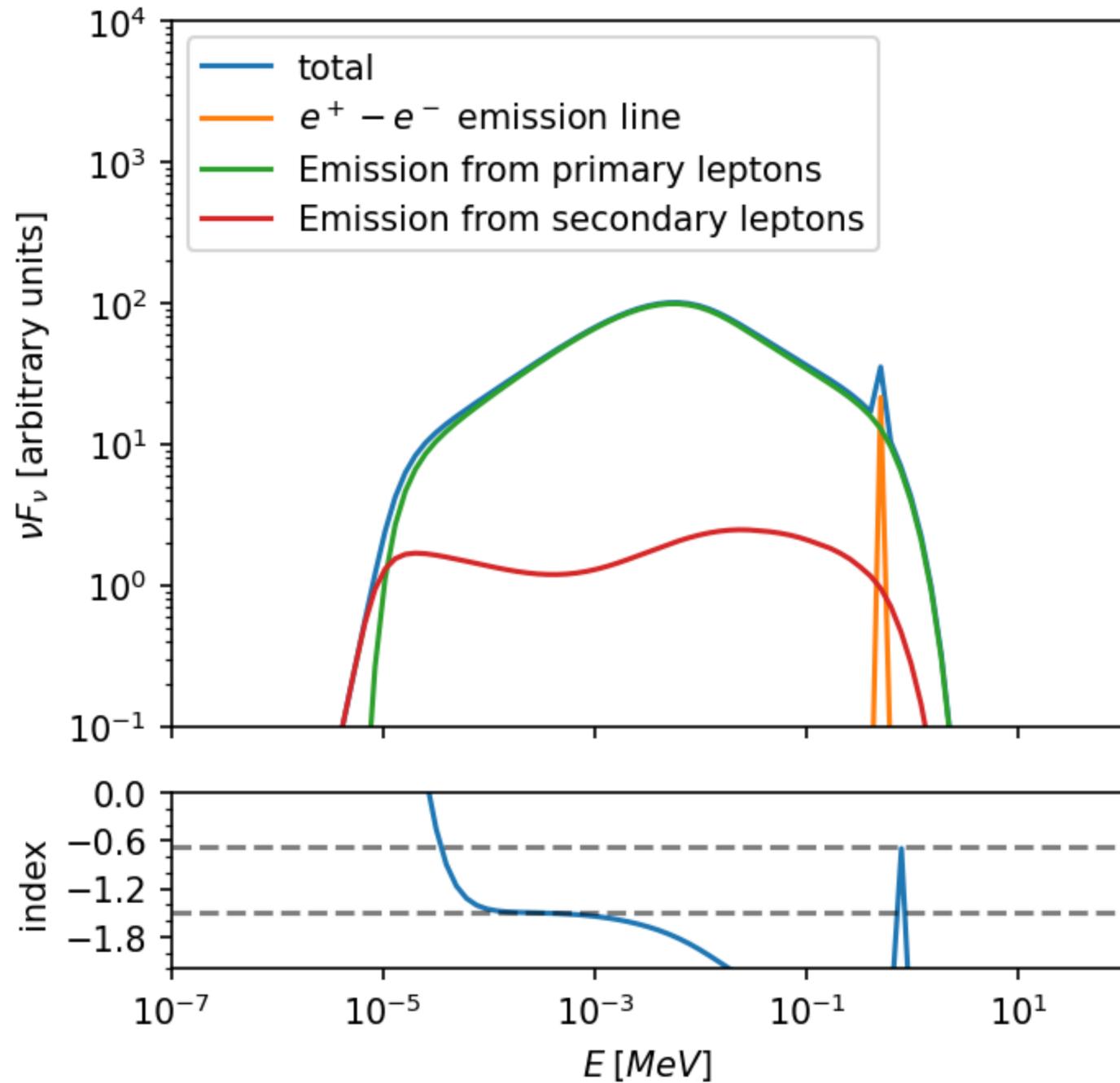


HLE schematic drawing

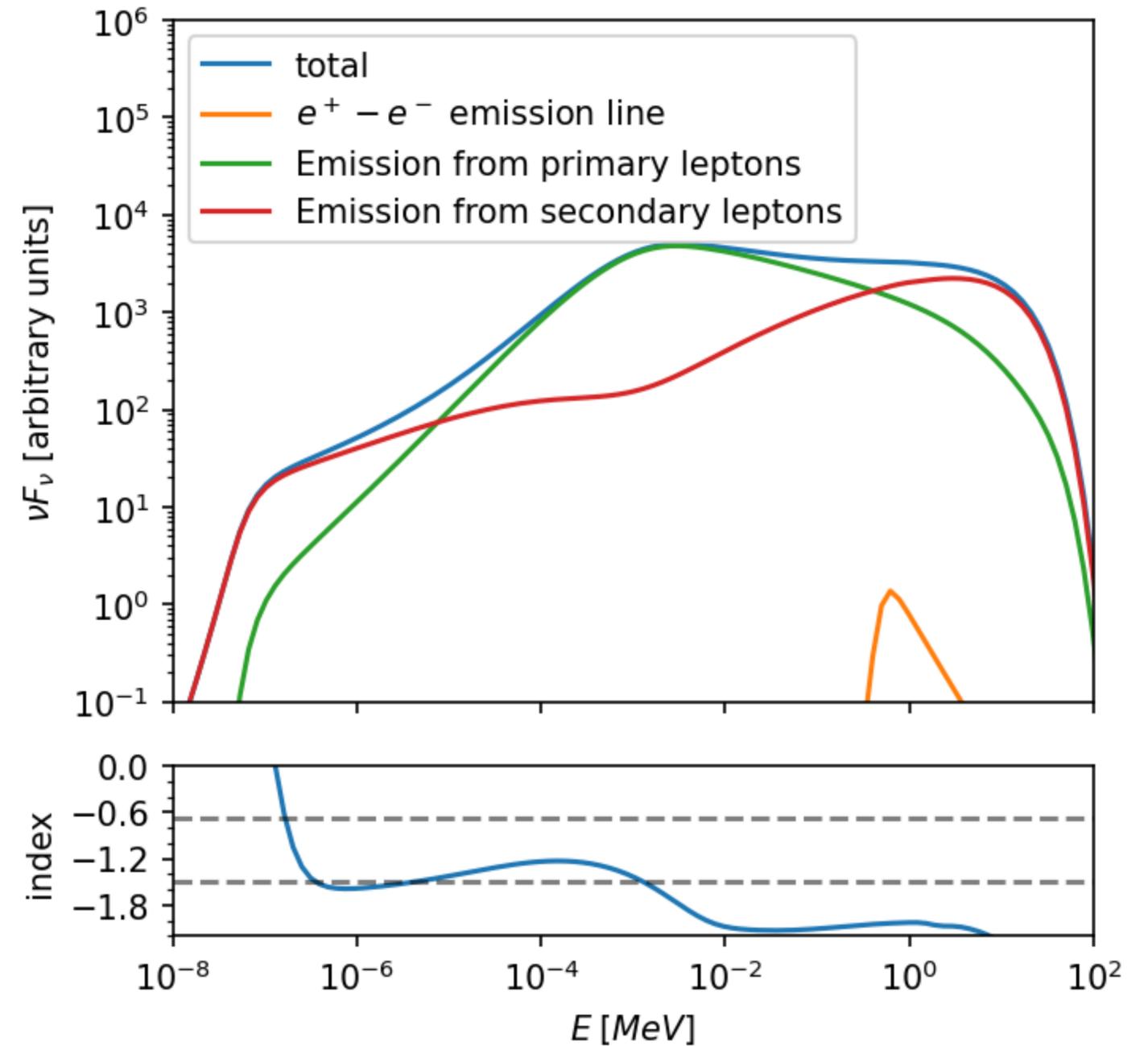


Pair production and annihilation Effect on the spectrum

Solving the coupled evolution of leptons and photons to get emerging spectra :



Line emergence conditions



Other effects on spectrum