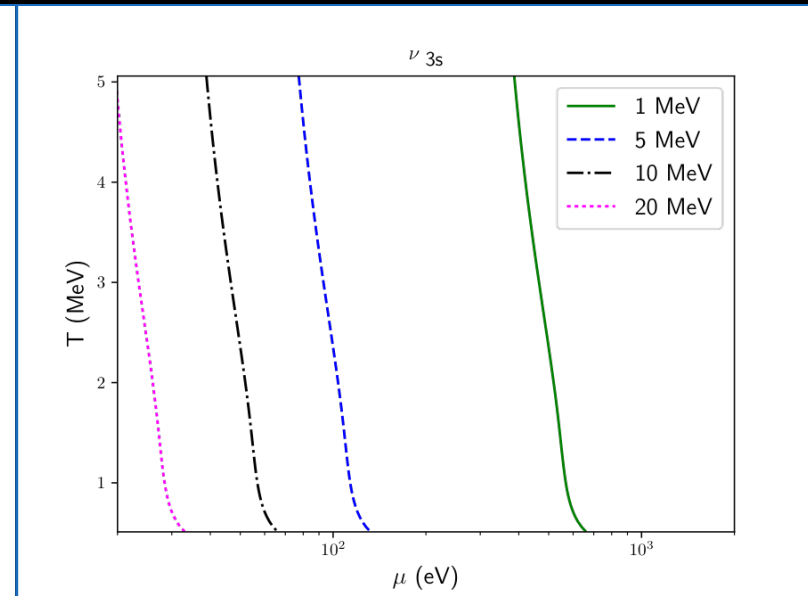
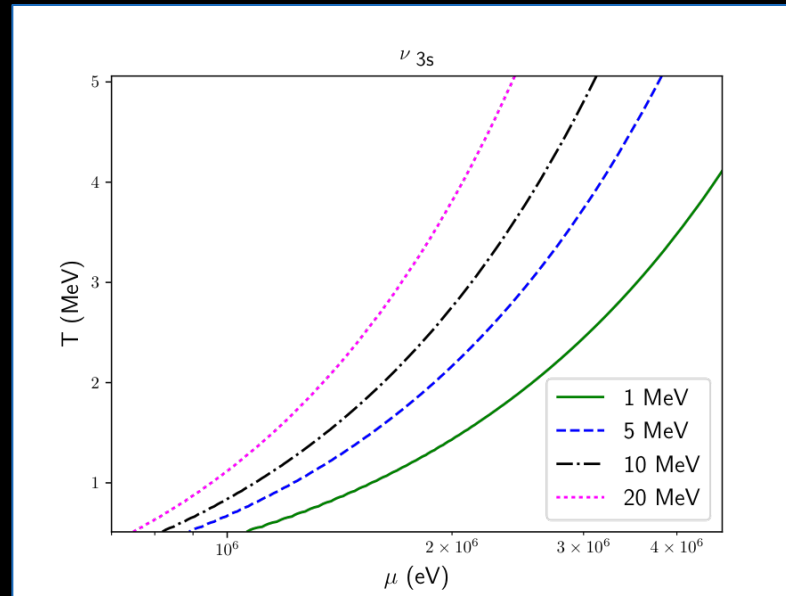
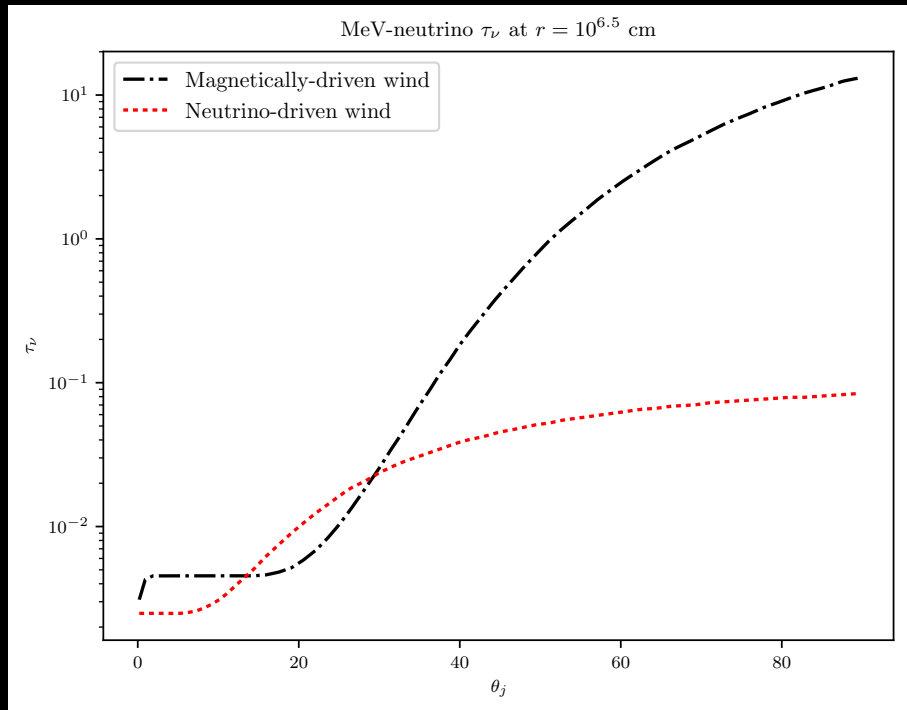


- Neutrino properties in a fireball
 - Neutrino effective potential
 - Moderate (BH-NS)
 - Strong (NS-NS)
 - Neutrino oscillation in a medium
 - MSW effect
 - Survival probabilities
 - Resonance lengths
 - Neutrino opacity

- We found a strong dependence between the direction propagation angle and magnetic field strength



Conclusions



- Neutrino opacity profile as a function of the half-opening jet angle at a radius of $10^{6.5}$ cm using a cross section of $\sigma_\nu (20 \text{ MeV}) = 3.8 \times 10^{-40} \text{ cm}^{-2}$

$$\tau_\nu > 1 \text{ for } \theta_j > 52^\circ$$

- MeV neutrinos would be directly affected by the strength of the field but also by their propagation angle along magnetic field lines.
- Topology of the internal magnetic field
- Effective tool to discriminate the progenitor in SGRBs using neutrino properties.
- Neutrino opacity \rightarrow On-axis/Off-axis view
- Neutrino preferential propagation way along jet direction
- First extra-galactic detection in the near future