Comparing the Light Distributions for Different Neutrino Flavours

Motivation

- Depending upon the type of neutrino that interacts,
  Cherenkov light may be emitted preferrentially
  in the forwards or backwards direction

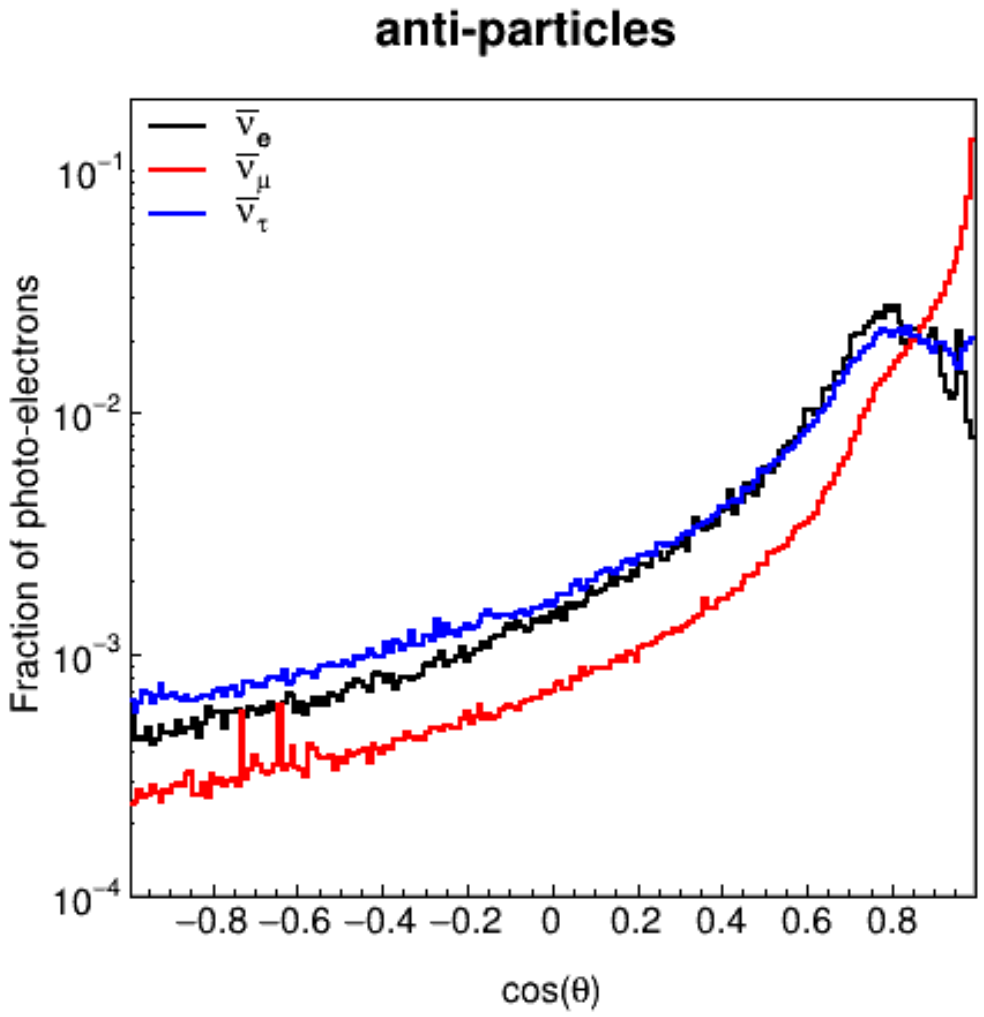
    - Evident for muon-(anti)neutrino interactions versus other flavours
      (i.e. track or shower)

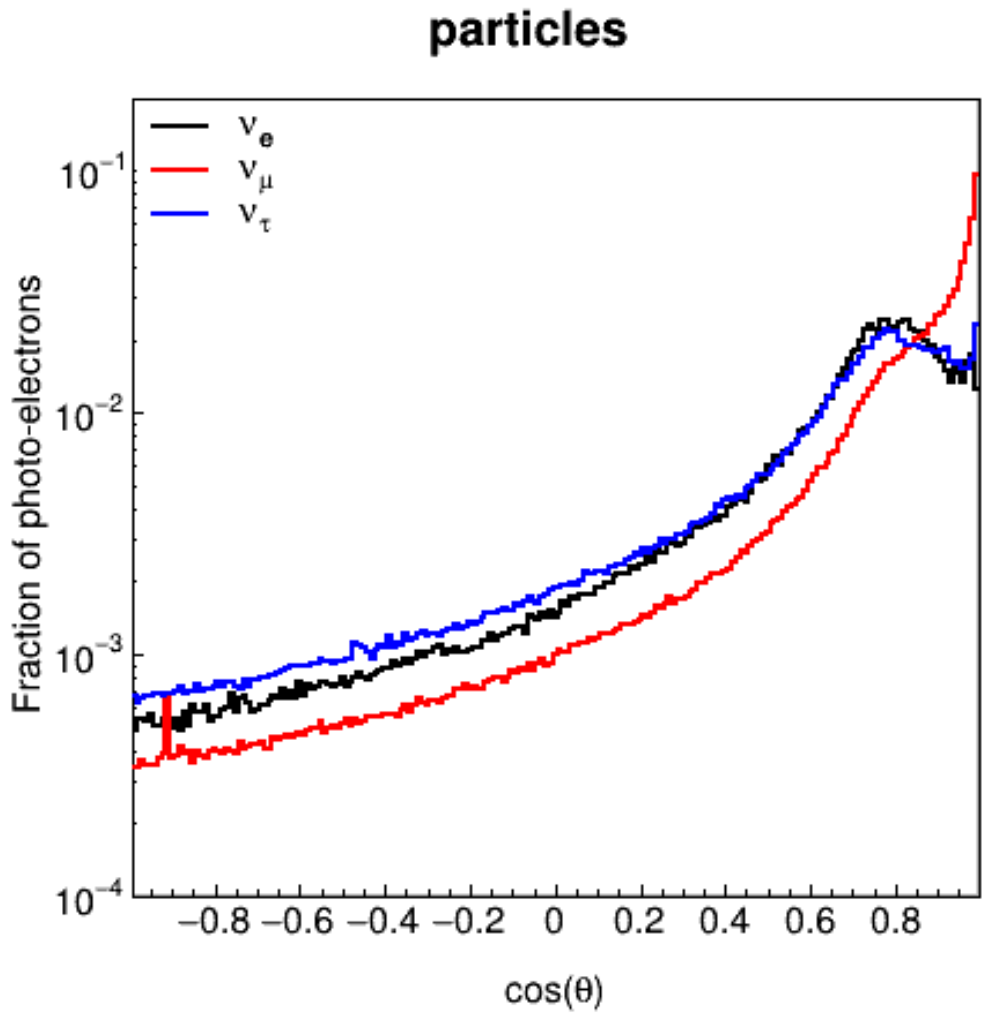
    - But perhaps also for tau-neutrinos:

        - Can decay hadronically
        - Produced almost at rest at low neutrino energies

--> Analyzed 10 KM3Sim files for each (anti-)neutrino flavour,
with O(10^4) interactions at 10-100 GeV energies

Flavour comparison

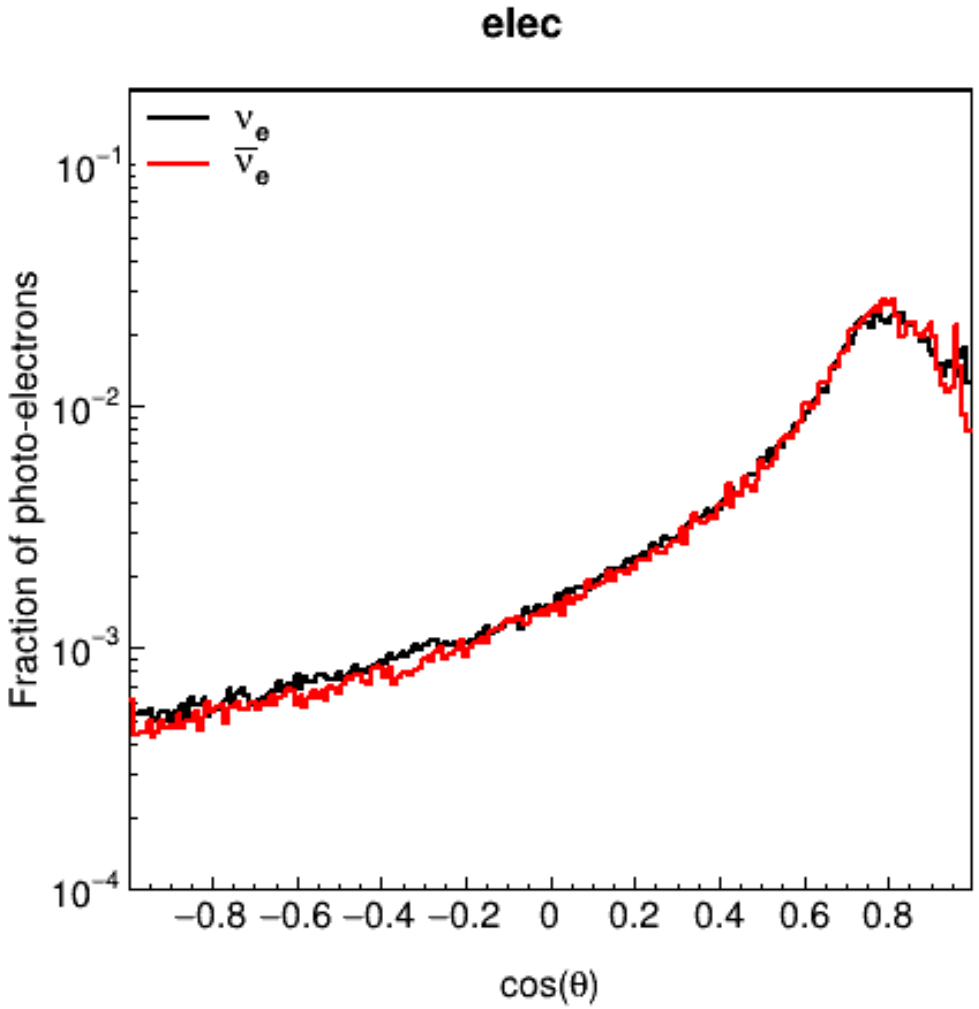




Discussion

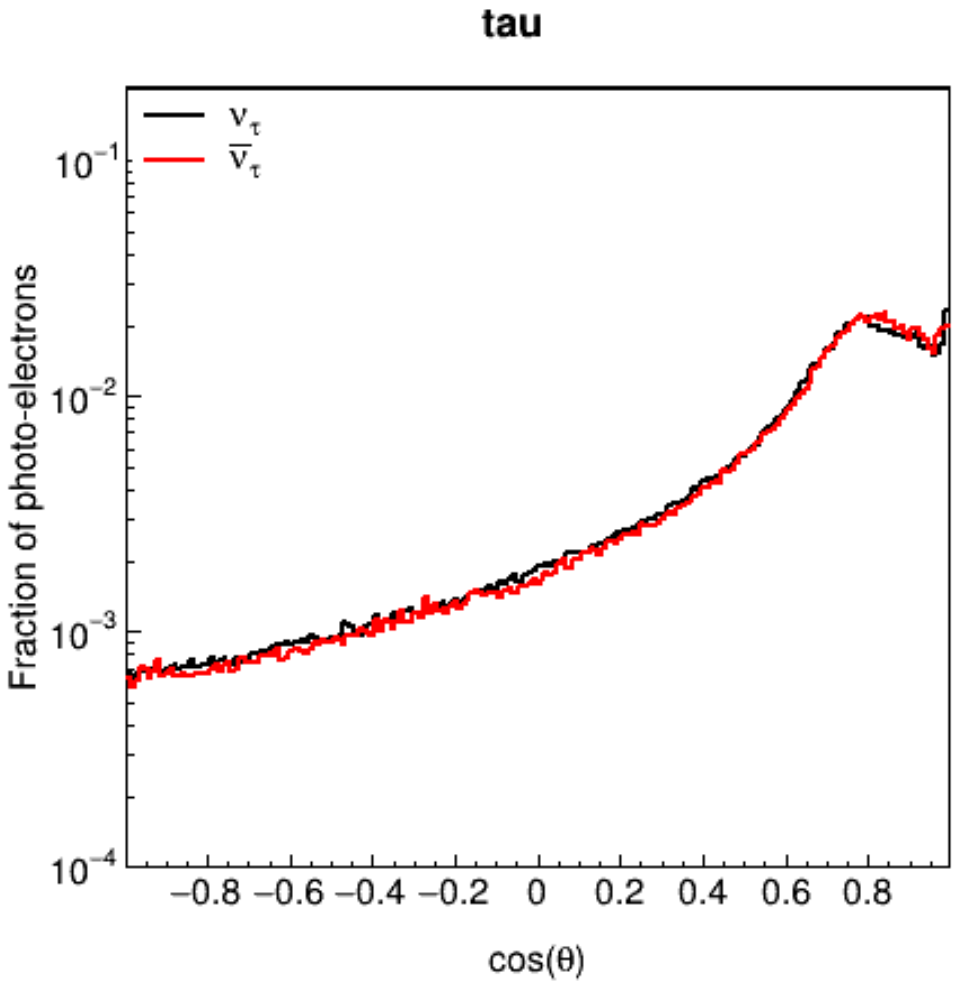
- Muon-neutrinos emit most light in the forward direction (no surprise)
- Both tau-neutrinos and tau-antineutrinos seem to emit slightly more light in the backward direction than their electron counterparts
- What about neutrinos versus antineutrinos?

Neutrino versus Antineutrino



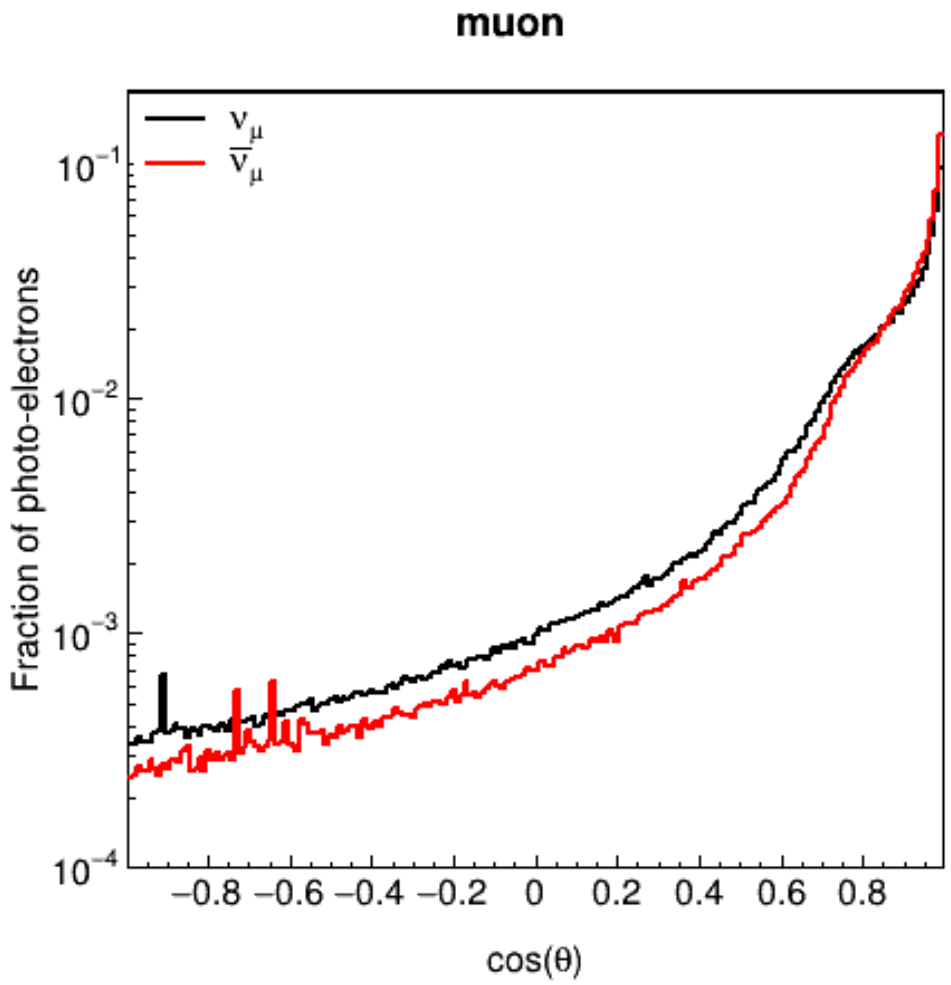
- No difference for electron (anti-)neutrinos

Neutrino versus Antineutrino



- No difference for electron (anti-)neutrinos
- Or tau (anti-)neutrinos

Neutrino versus Antineutrino



- No difference for electron (anti-)neutrinos
- Or tau (anti-)neutrinos
- Seemingly more light backwards
  for muon-neutrinos than for muon-antineutrinos
  - Physics?
  - Or some artifact in the generation/normalisation?