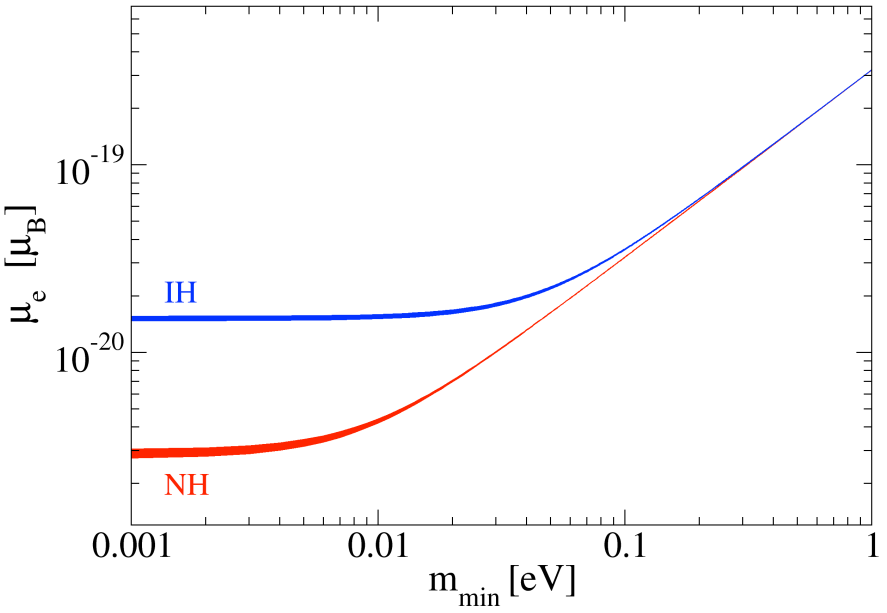
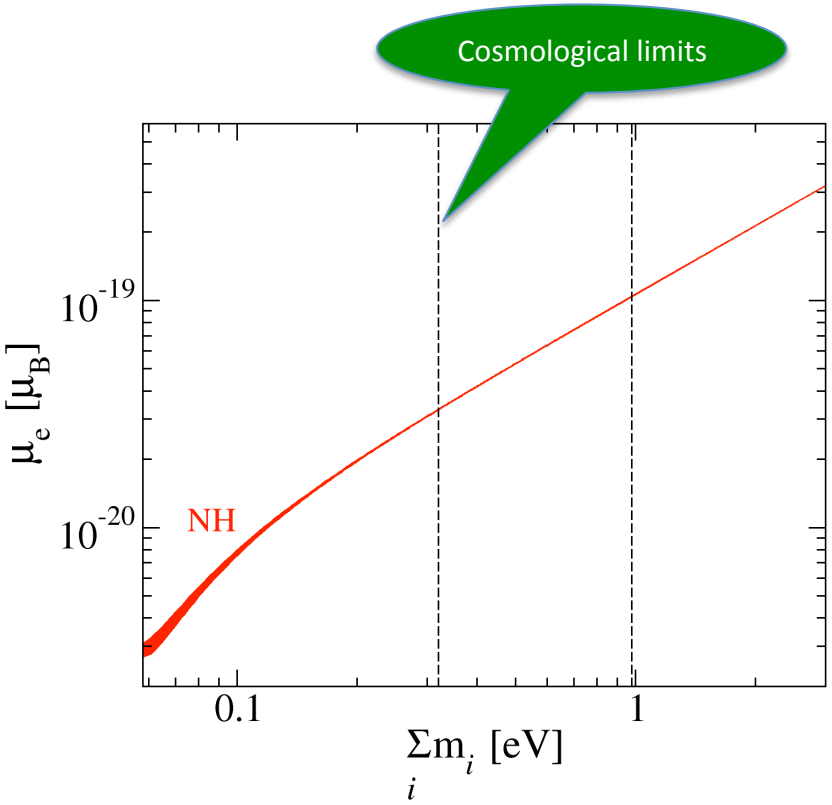
Figure slides from Balantekin's KITP talk

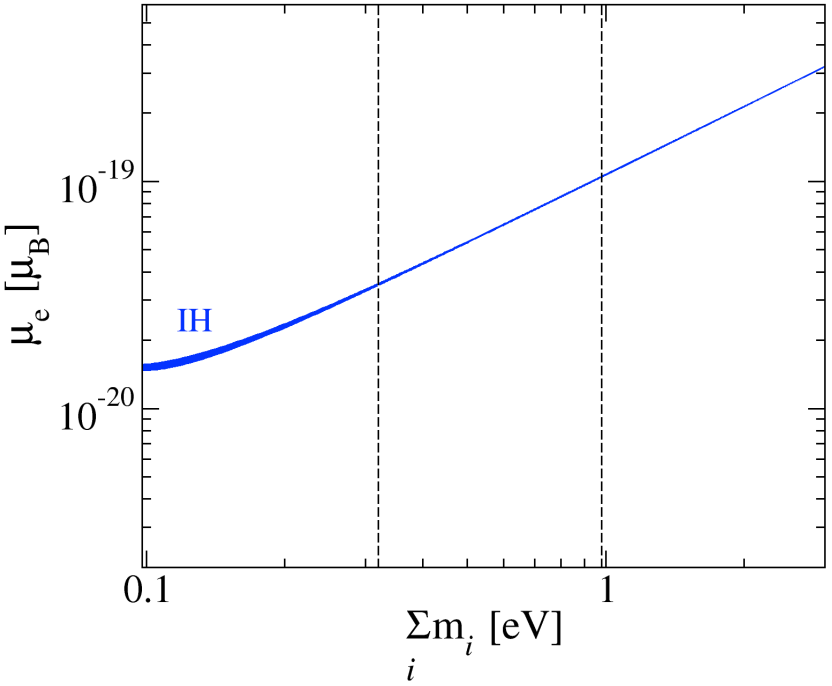
October 8, 2014

Standard Model (only) contribution to the Dirac neutrino magnetic moment measured at reactors

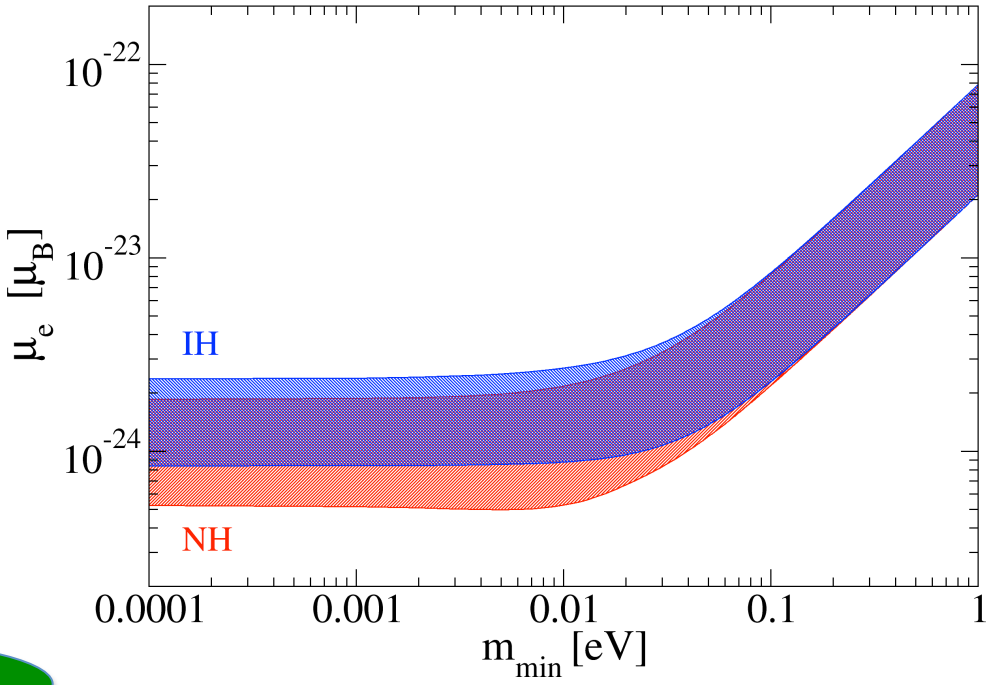
A.B.B., N. Vassh, arXiv:1312.6858
PRD **89** (2014) 073013



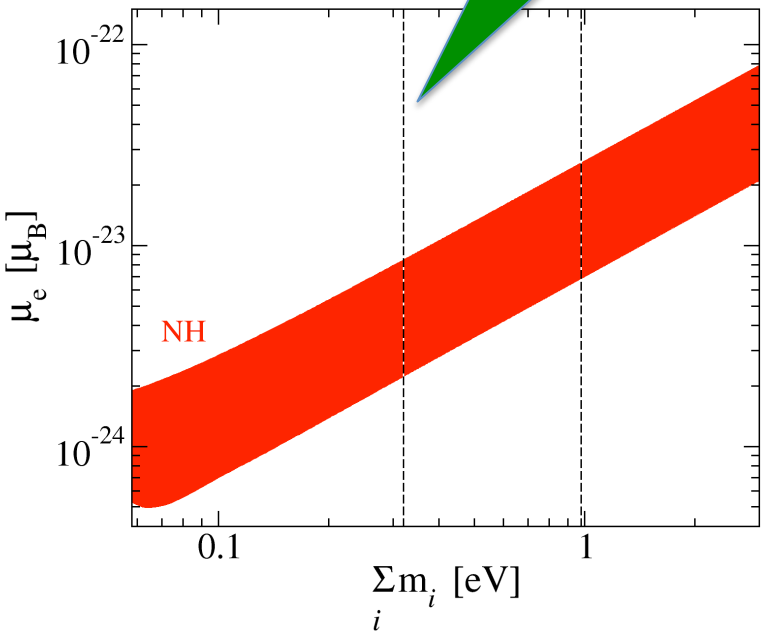


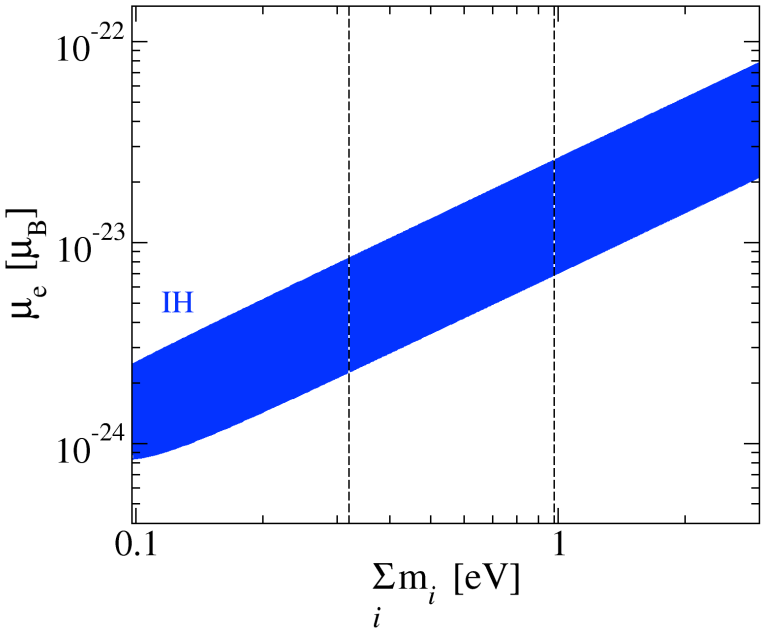


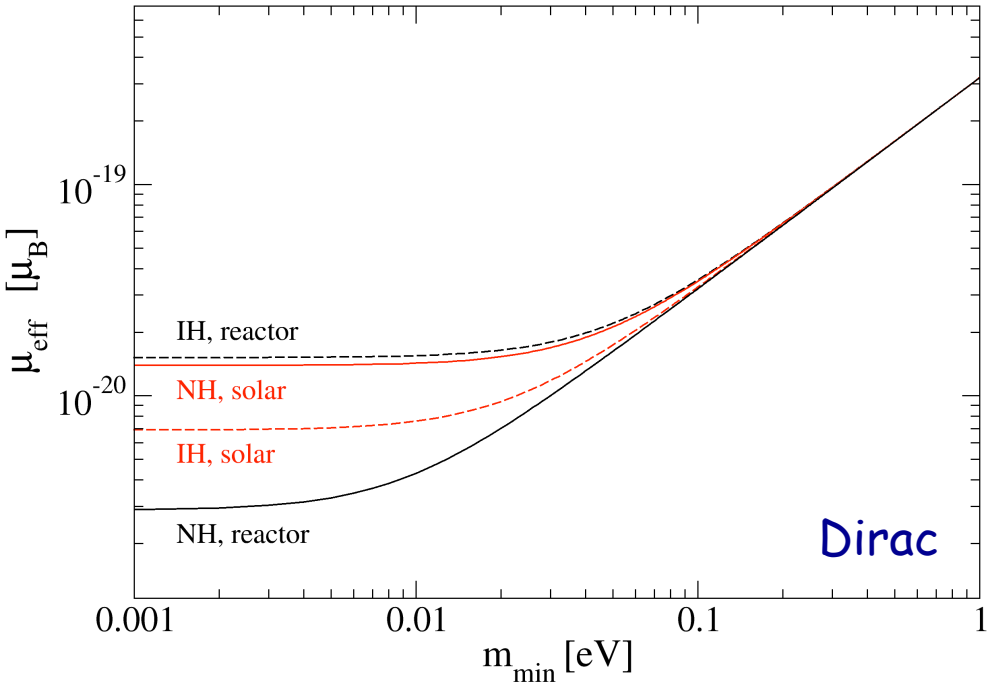
Standard Model (only) contribution to the Majorana neutrino magnetic moment measured at reactors



Cosmological limits

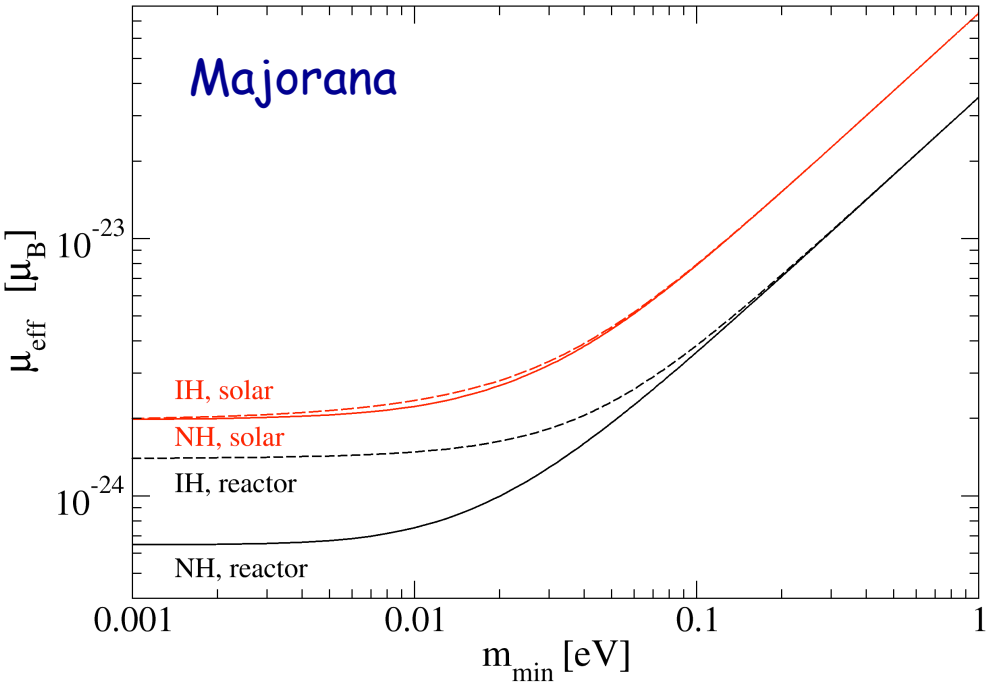


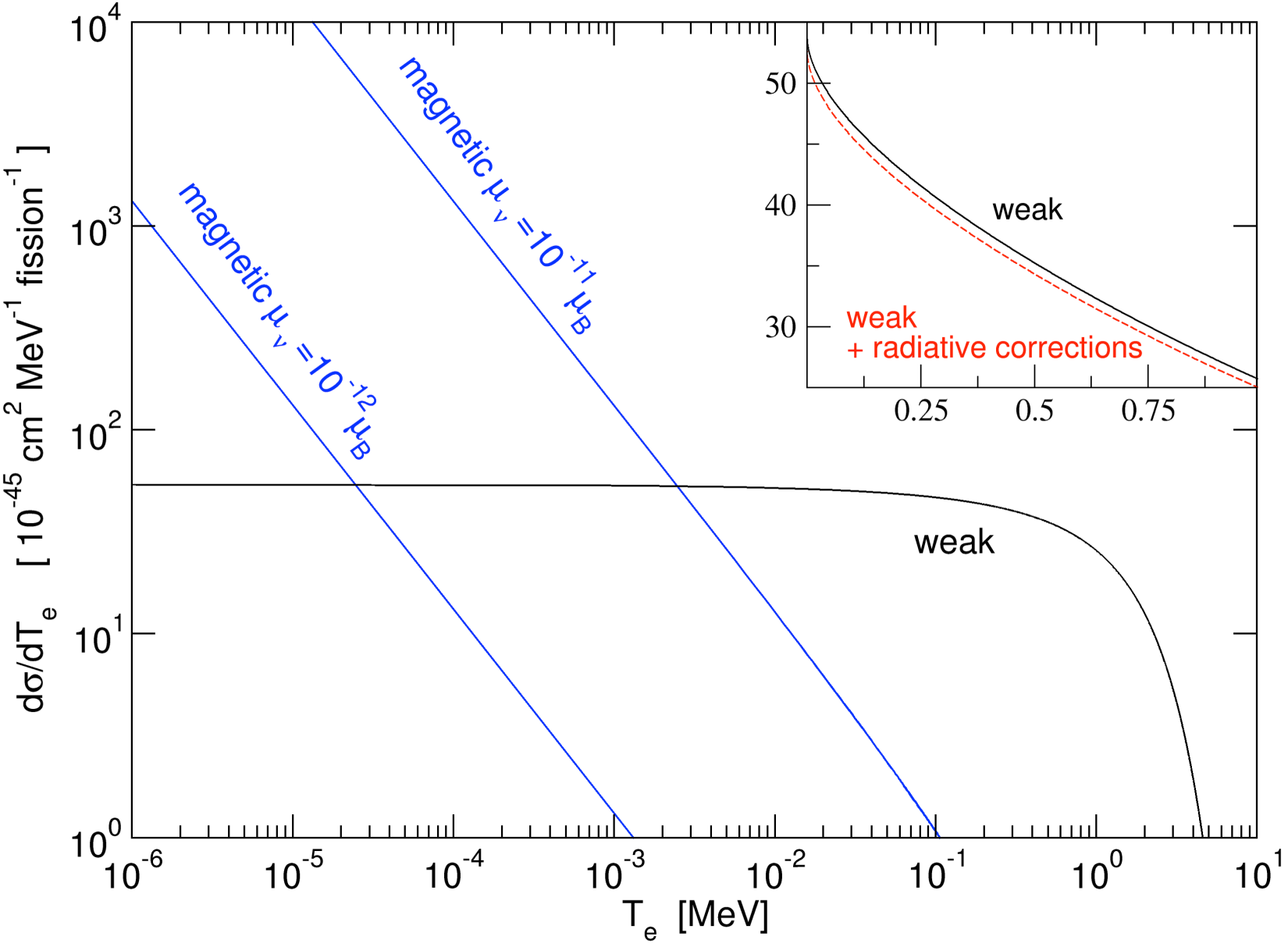


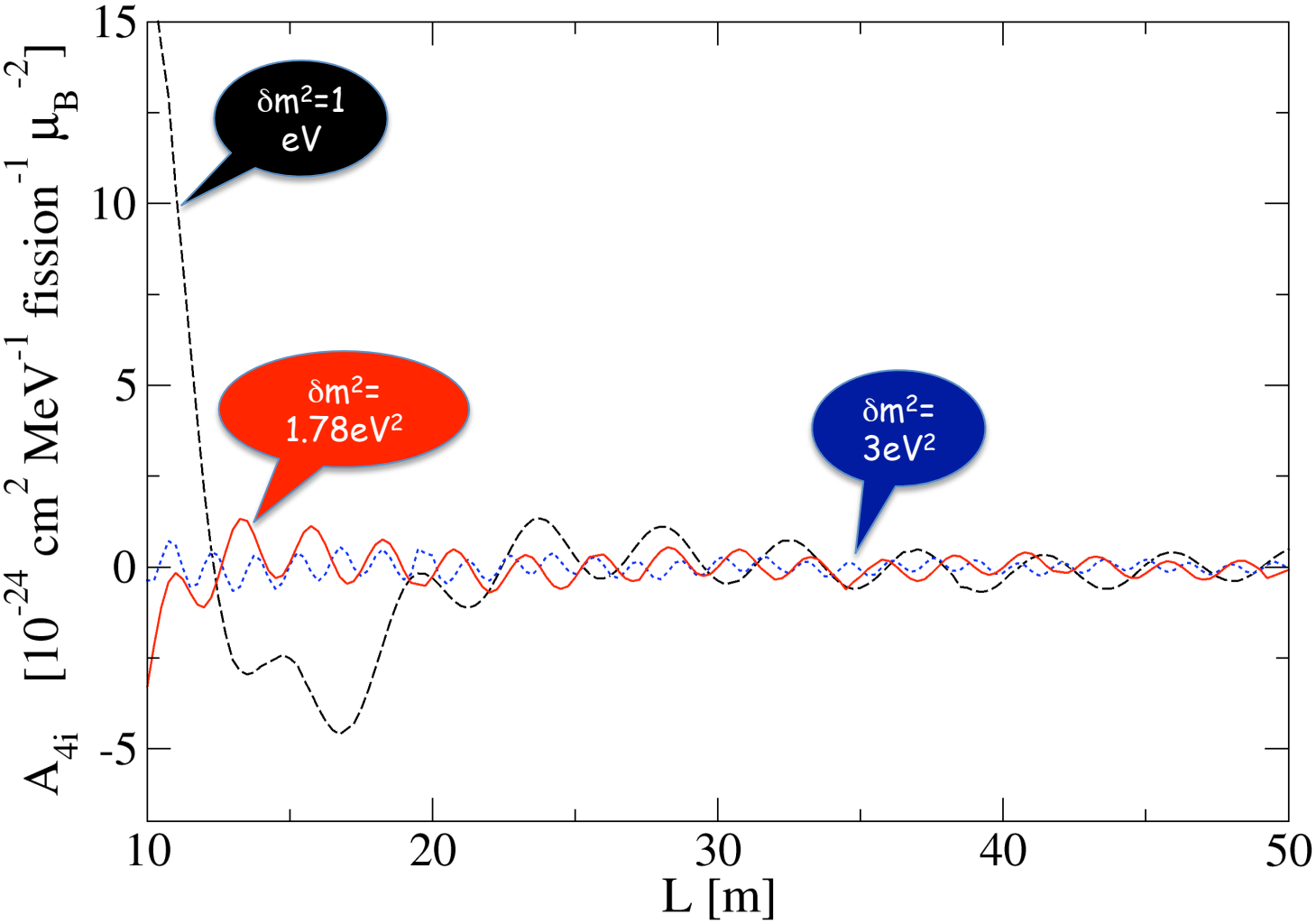


Reactors vs. solar Cerenkov detectors

A.B.B. & N. Vassh
AIP Conf.Proc. **1604** (2014) 150
arXiv:1404.1393




10^4
10^3
10^2
10^1
10^0
$d\sigma/dT_e$ [10^{-45} cm^2 MeV^{-1} fission^{-1}]
magnetic $\mu_\nu = 10^{-11}\ \mu_B$
magnetic $\mu_\nu = 10^{-12}\ \mu_B$
weak
50
40
30
weak
weak
+ radiative corrections
0.25
0.5
0.75
10^{-6}
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^0
10^1
T_e [MeV]



$$A_{4i} = \int_{E_\nu,\min}^{\infty} \frac{2\alpha^2\pi}{m_e^2}\left[\frac{1}{T_e} - \frac{1}{E_\nu}\right]\left[\cos\left(\frac{\delta m_{4i}^2 L}{2E_\nu}\right)\right]\left(\frac{dN}{dE_\nu}\right)dE_\nu$$

For a sufficiently heavy sterile neutrino the phases with $(E_4 - E_i)L$ average to zero

$$\mu_{eff}^2 = \sum_{i,j=1}^{3}\left[U_{ei}\left(\mu\mu^+\right)_{ij}U_{je}^+\right] + U_{e4}\left(\mu\mu^+\right)_{44}U_{4e}^+$$

$$\Rightarrow \mu_{eff}^2 \le \sum_{i=1}^{3}\mu_{i4}^2 + \left(1-\left|U_{e4}\right|^2\right)\sum_{i,j=1}^{3}\mu_{ij}^2$$