

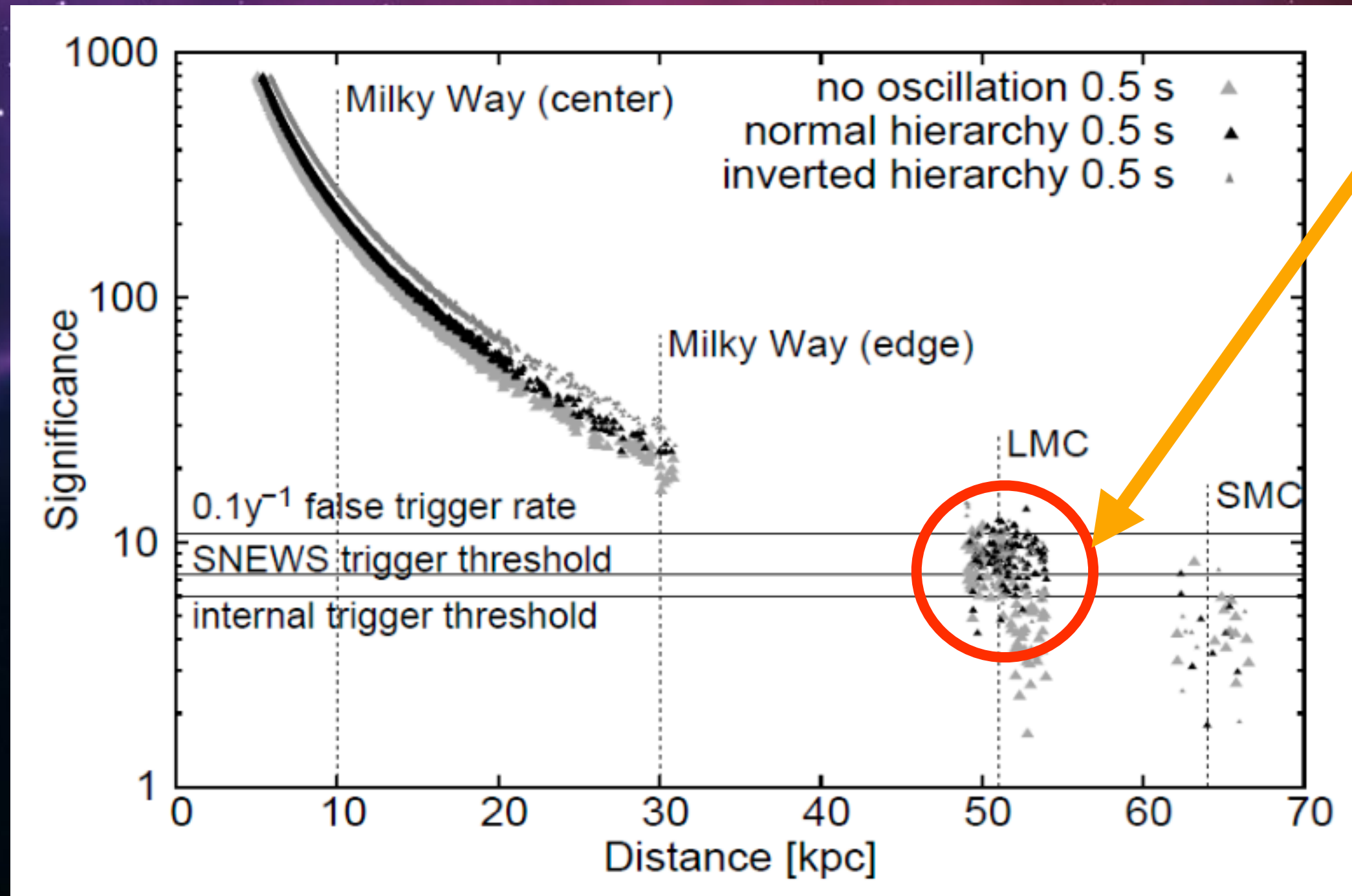
SEARCHING FOR LOCAL GROUP SUPERNOVAE USING HE NEUTRINOS FROM CSM INTERACTION



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Observational reach in IceCube using low-energy neutrinos is limited to \sim LMC (5σ)

Motivation



Shock interaction with CSM material accelerates protons, which collide creating pions. These pions decay producing HE neutrinos.



IDEA: Could we use the HE neutrinos from CSM interaction to extend the observational reach?

PREDICTED NUMBER OF MUONS

'New prospects for detecting HE neutrinos from nearby SN'

Murase et al.

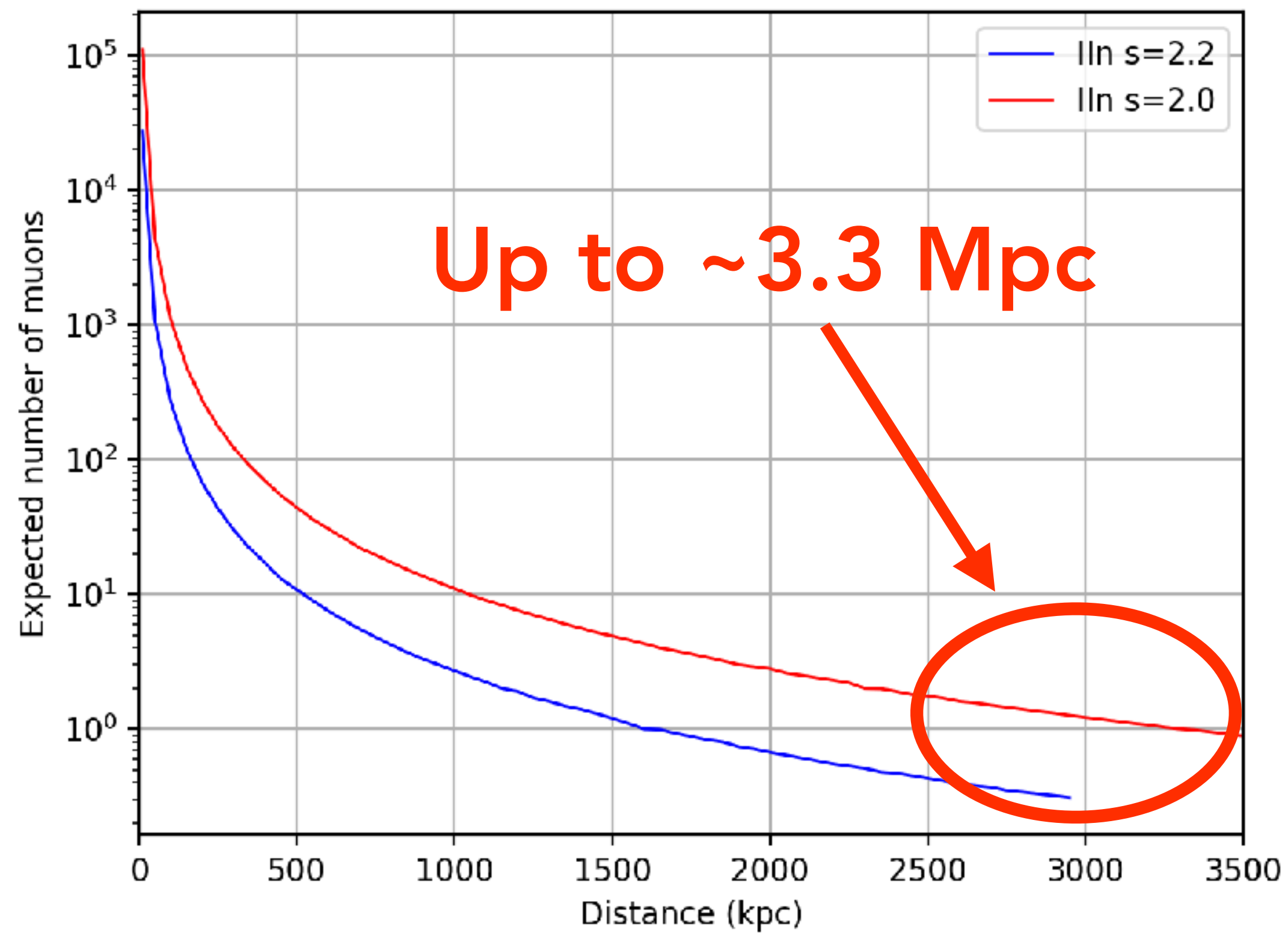
IIn $\sim 10^5$ >1 TeV muons

High amount of CSM \rightarrow More HE neutrinos

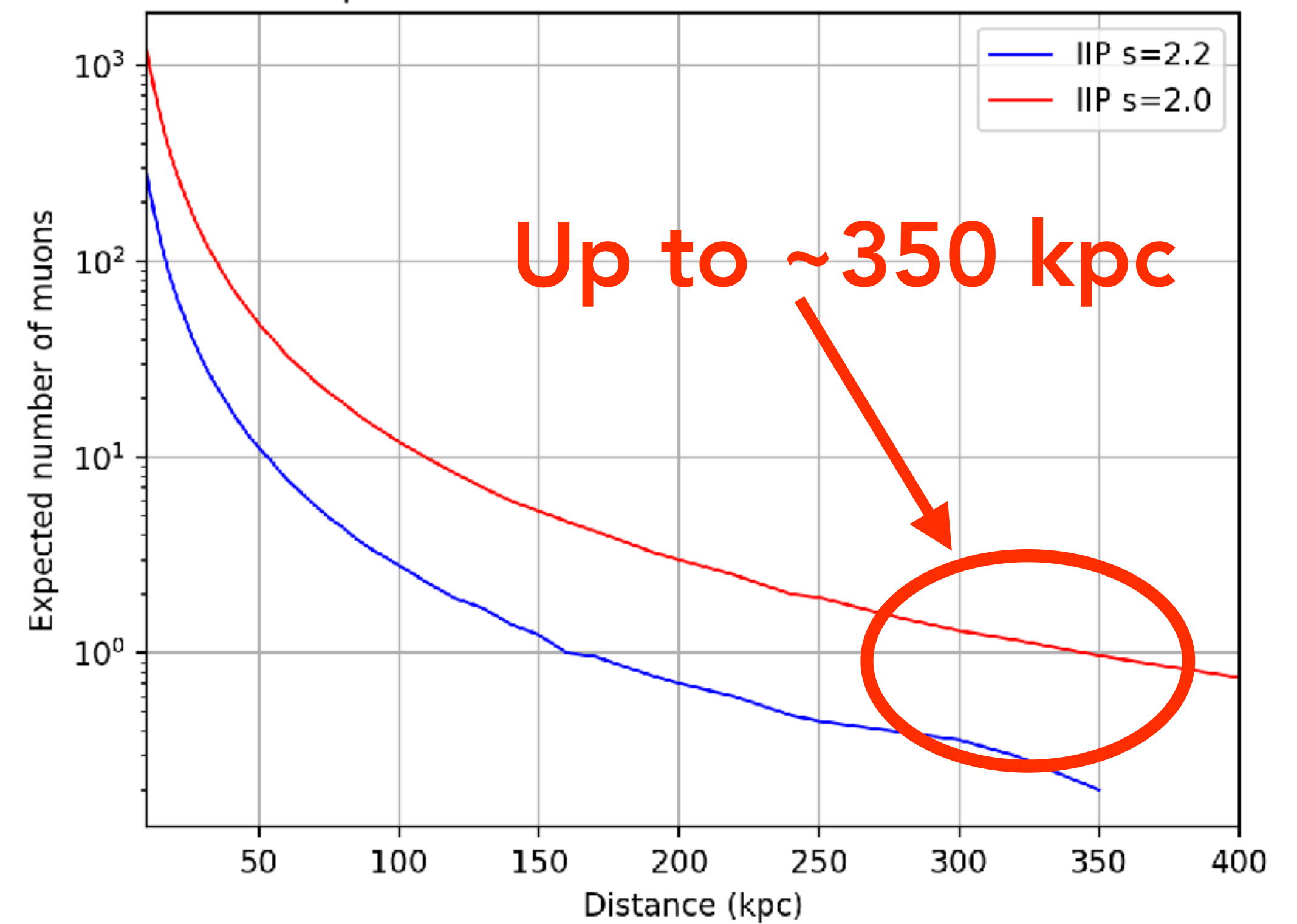
IIP $\sim 10^3$ >1 TeV muons

More common type of SN

RESCALING OF MURASE'S DATA



RESCALING OF MURASE'S DATA



ANALYSIS



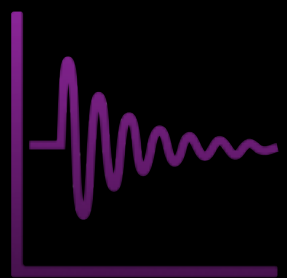
How far away can we extend IceCube's observational reach of supernovae?



Which galaxies can we reach using these HE neutrinos? Is it possible to observe the entire local group?



Is photon extinction a potential problem in the local group?



Is it possible to use additional IceCube data, such as cascade events, to improve the sensitivity?