Fermilab

U.S. DEPARTMENT OF ENERGY | Office of Science

SRF Technology at Fermilab

SPAFOA

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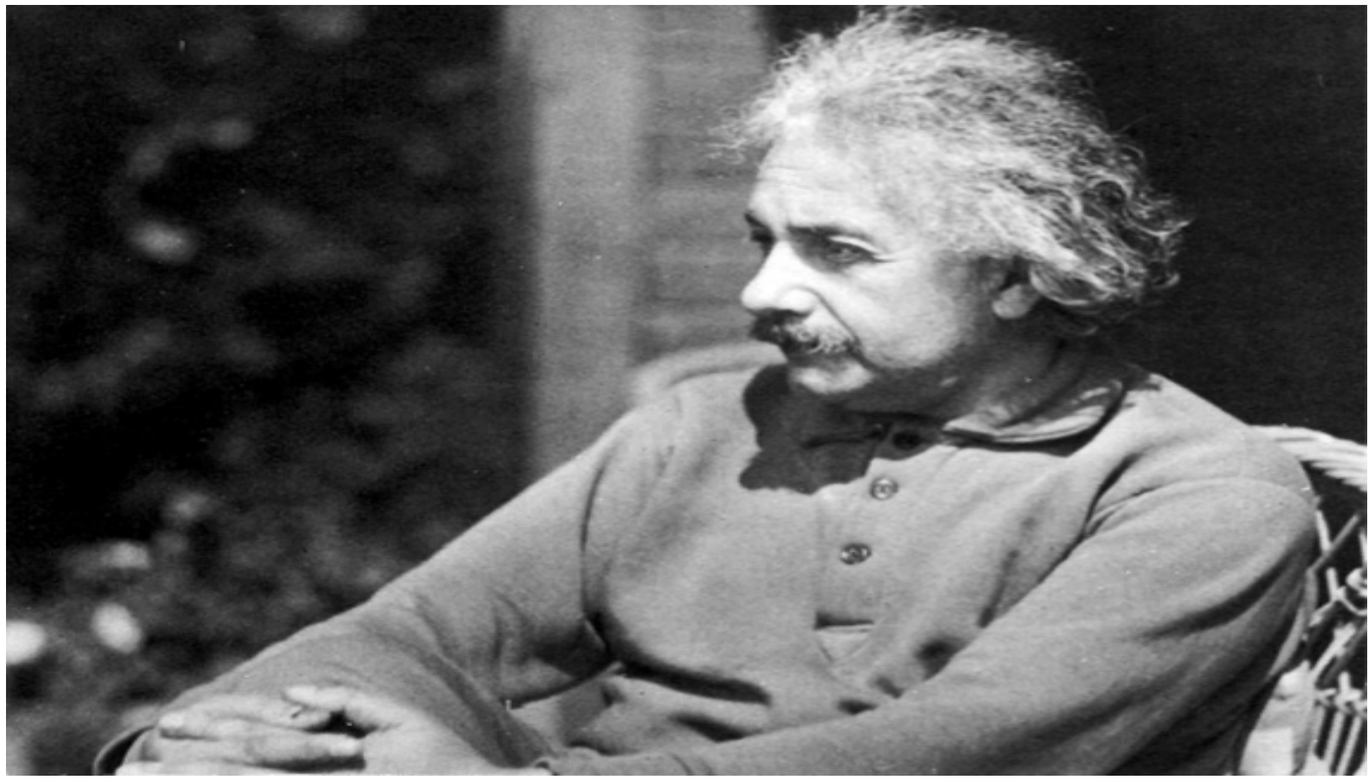
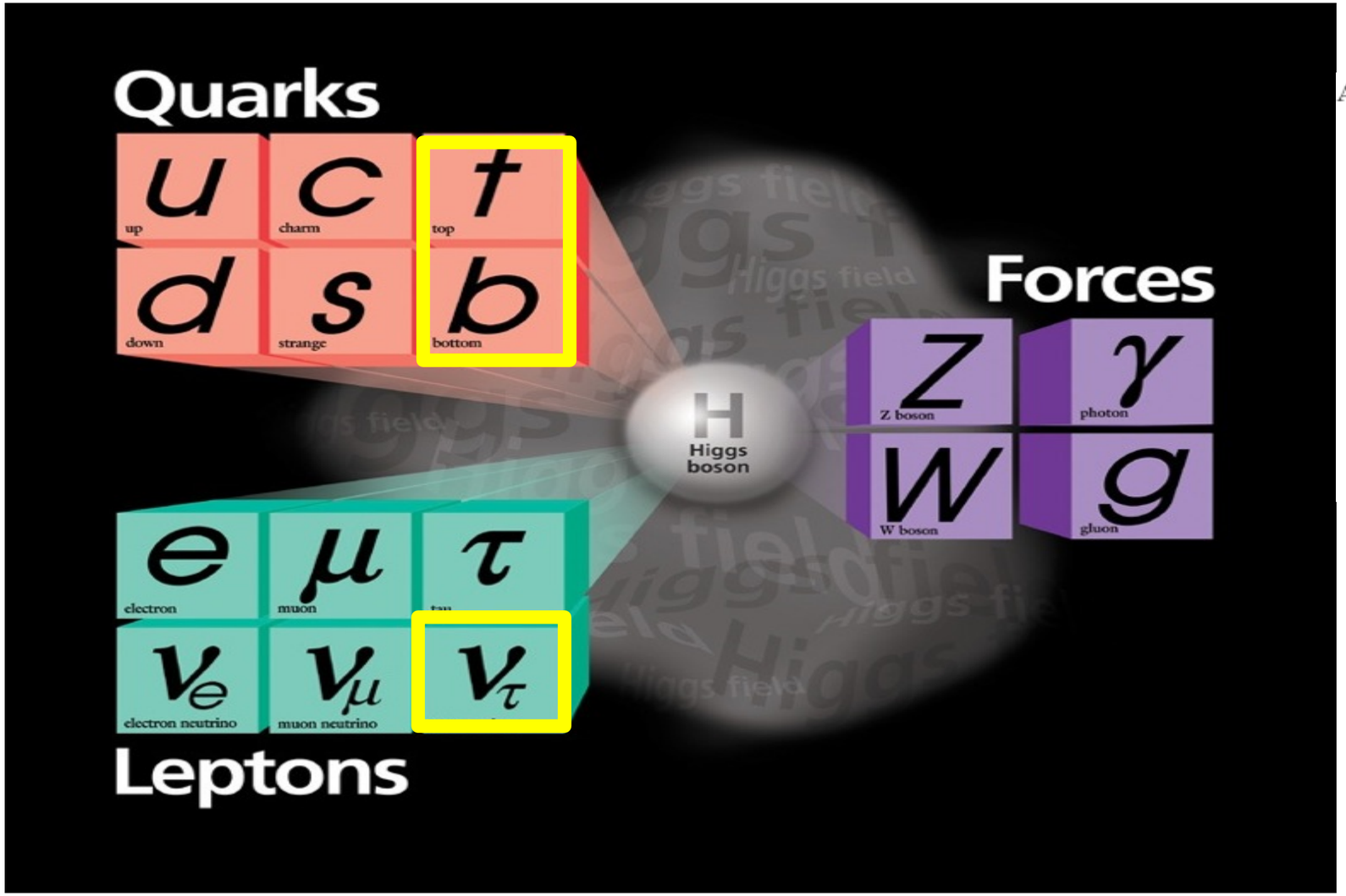
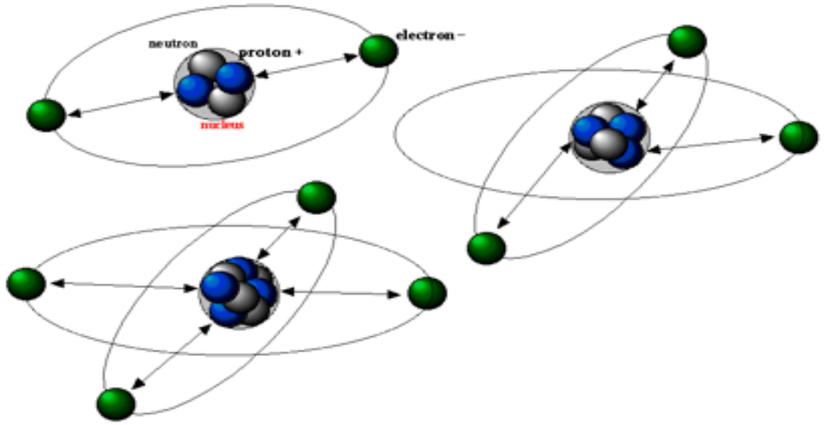
One cannot help but be in awe contemplating the mysteries…..of the marvelous structure of superconducting radiofrequency cavities and cryomodules……



The Standard Model…..ingredients of the quantum universe…3 flavors



Atomic Structure



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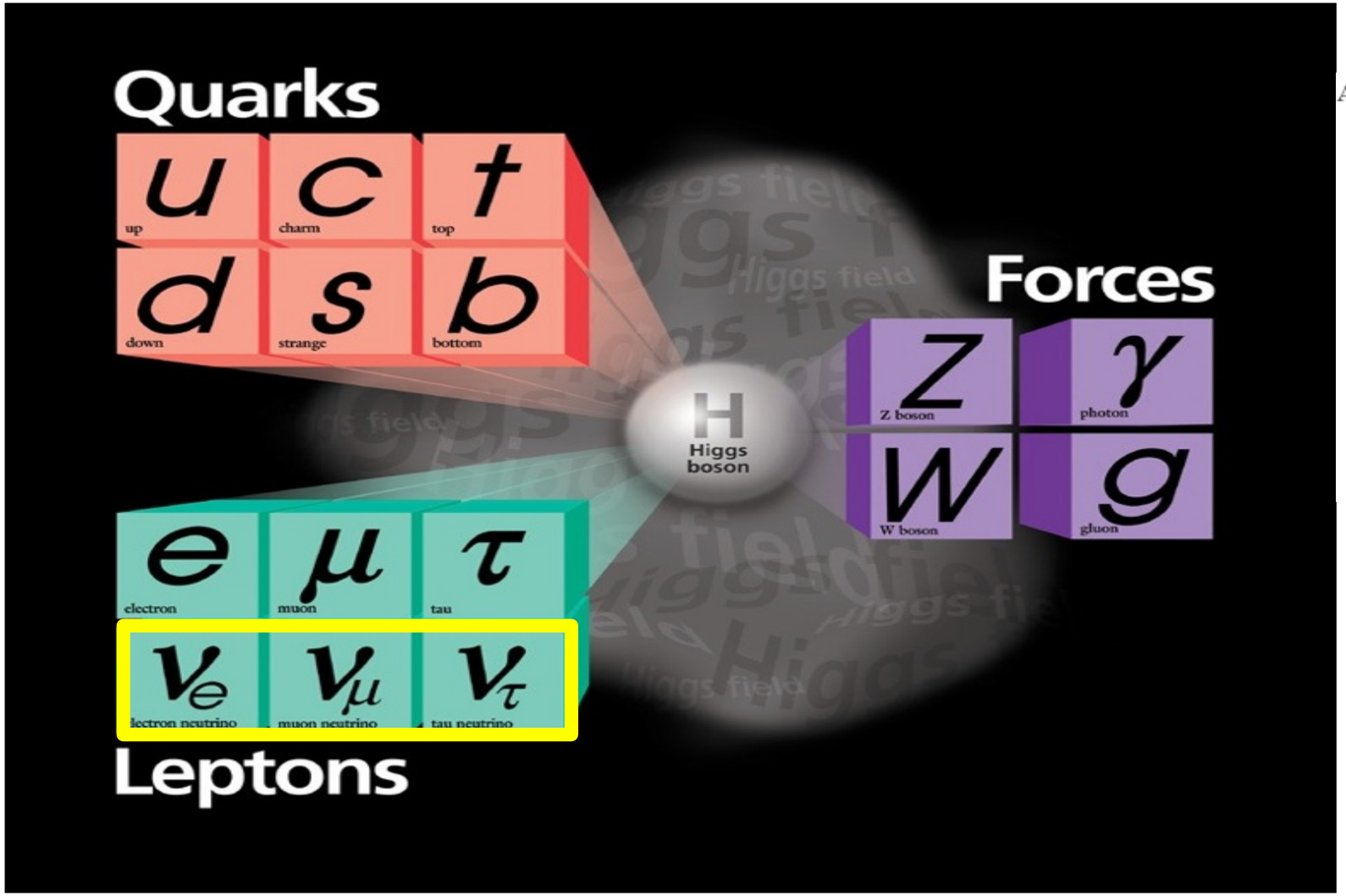

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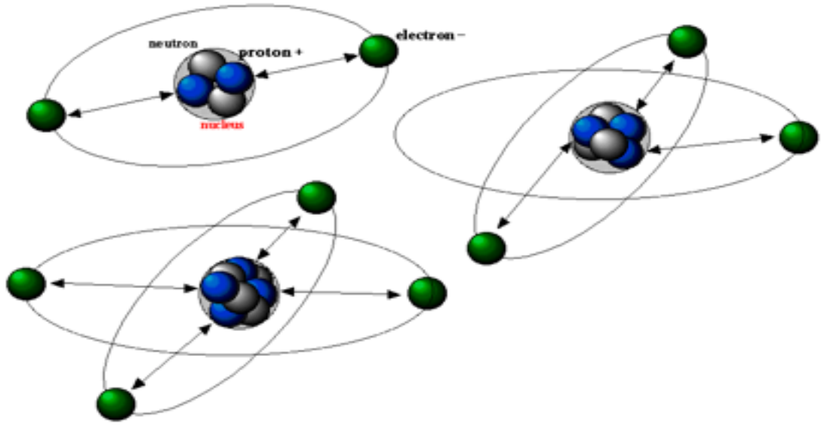


What gives mass to Quarks & Leptons?

u
up

c
charm

d
down

s
strange

ν_e
e-neutrino

ν_μ
μ-neutrino

e
electron

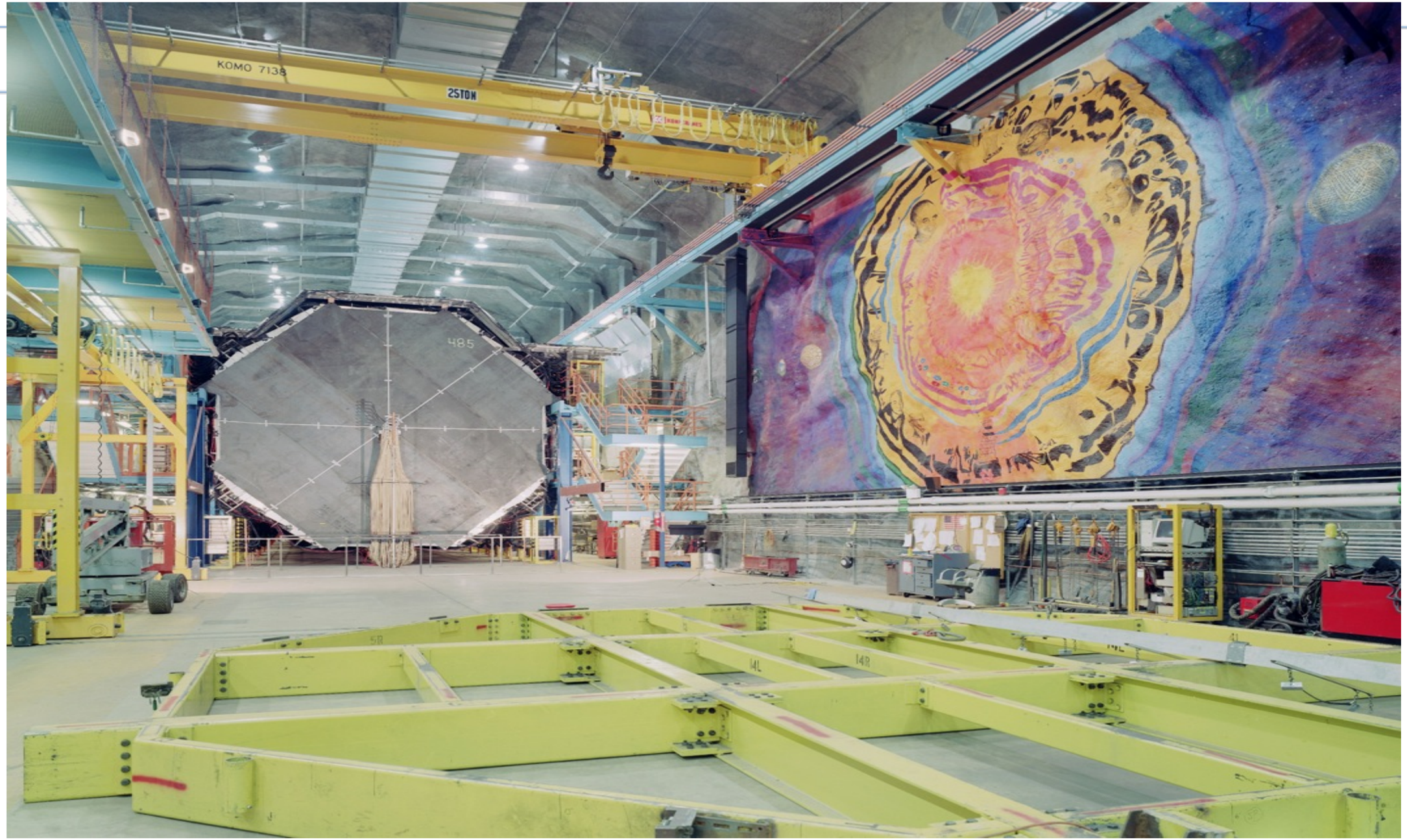
μ
muon

b
bottom

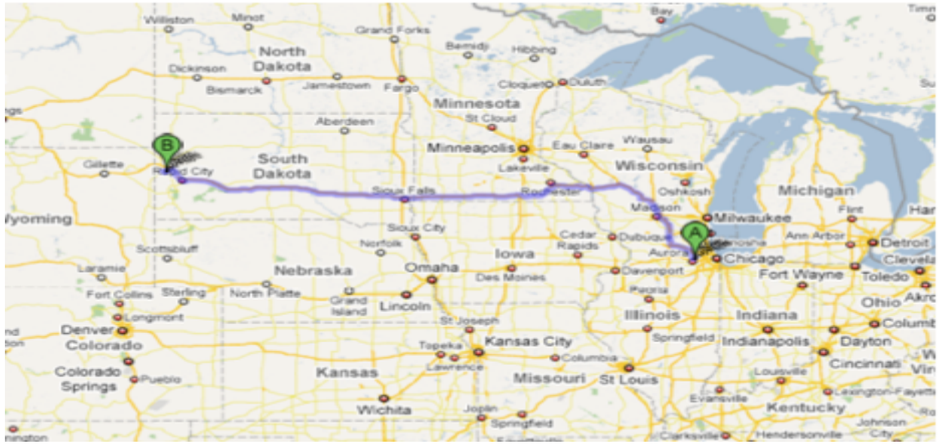
ν_τ
τ-neutrino

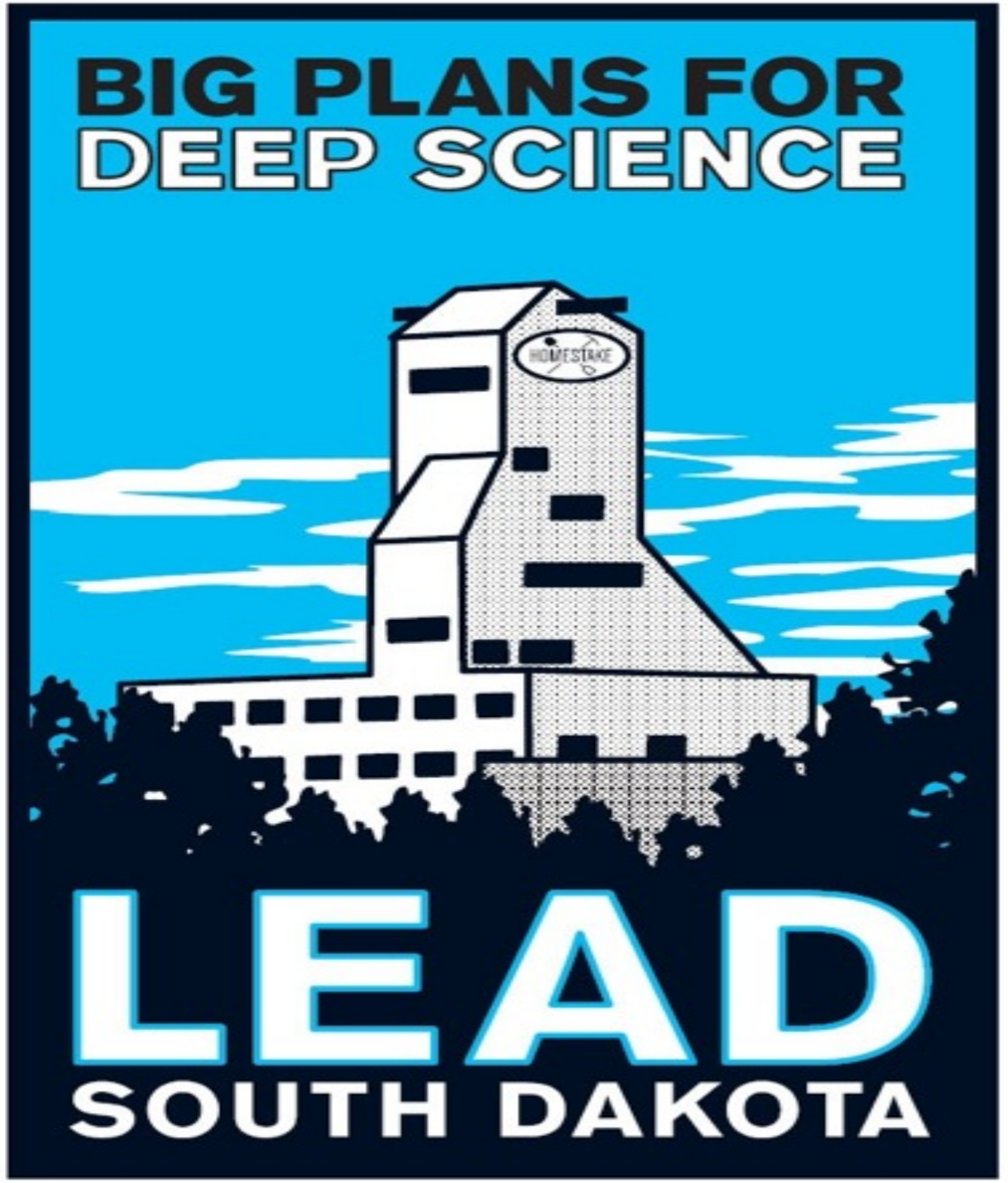
τ
tau

plus corresponding antiparticles


KOMO 7138
25TON
485
5R
14L
14R

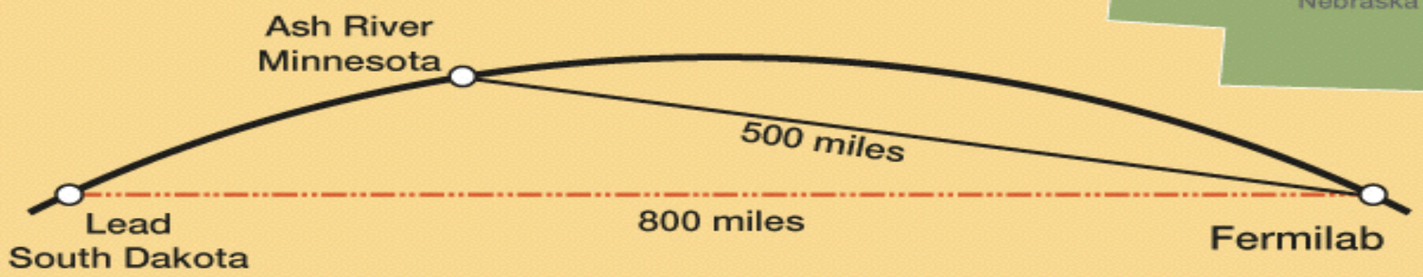
A golden opportunity…..



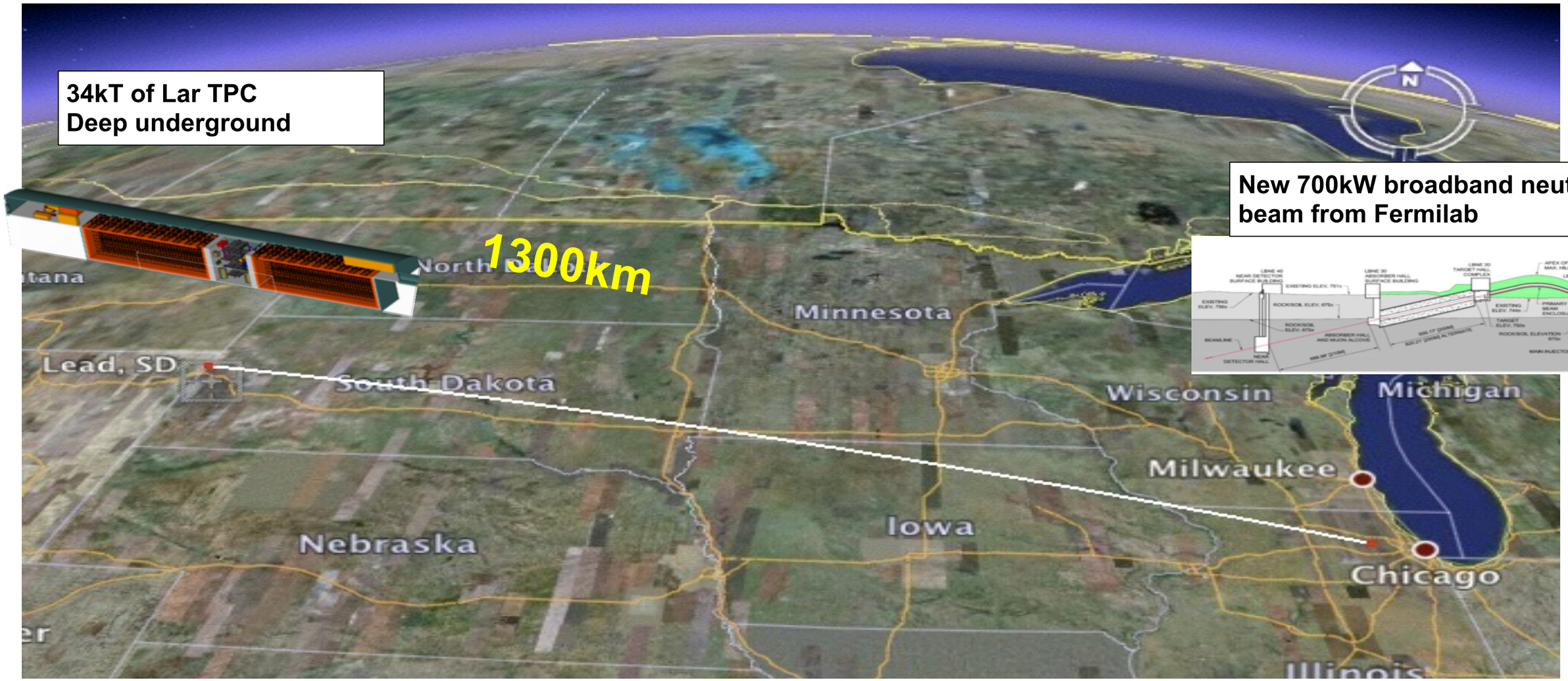


Straight Through the Earth

MINOS	Soudan Mine, MN	2340 ft deep
NOvA	Ash River, MN	Surface level
LBNE	Homestake Mine, SD	4850 ft deep



The LBNE experiment....Fermilab flagship



SRF Technology at Fermilab

- Significant investment in SRF by DOE/Office of Science/HEP at Fermilab
- We are expecting several significant projects in next few years to use SRF technology in the US and off shore
- Fermilab has worked hard with US manufacturers to develop the technology
- We think this begins to pay off as larger numbers of high quality (high Q) cavities produced for future projects are required

- Neutrino beams are starved for more intensity….to have a world leading neutrino program Fermilab must make the most intense beams of neutrinos
- SRF will allow us to make the most intense beams of protons and impinge them on target to make the neutrino beam with minimal power requirements

Advanced Accelerator Research

Illinois Accelerator Research Center (IARC)

Office, Technical and Education Building (OTE)

- ❑ 48,000 gross square footage
- ❑ 23,000 SF of Office Space (145 offices)
- ❑ 3,700 SF Light Tech Space
- ❑ 3,900 SF New Lecture Hall (175 seats)
- ❑ 900 SF Meeting Rooms
- ❑ 250 car parking lot

Heavy Assembly Building (HAB)

- ❑36,000 sq ft
- ❑50 T crane
- ❑deep pit for radiation shielding of accelerators
- ❑40 more offices, tech space, machine shop, extensive infrastructure

Thank you