Números leptônicos

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Lepton	Conserved Quantity	Lepton Number
e^-	L_e	+1
ν_e		+1
μ^-	L_μ	+1
ν_μ		+1
τ^-	L_τ	+1
ν_τ		+1

Anti-Lepton	Conserved Quantity	Lepton Number
e^+	L_e	-1
$\bar{\nu}_e$		-1
μ^+	L_μ	-1
$\bar{\nu}_\mu$		-1
τ^+	L_τ	-1
$\bar{\nu}_\tau$		-1

https://slidetodoc.com/particle-physics-true-or-false-the-fundamental-particles/

- A tabela acima tem partículas que não vimos. O neutrino do decaimento β é o antineutrino do elétron $\bar{\nu}_e$. O múon tem também seu próprio neutrino. E há ainda outro lépton, o tau.
- Além do número leptônico, há os números mais específicos das famílias leptônicas (L_e, L_μ, L_τ). Esses são em geral conservados, exceção para o caso de oscilações de neutrinos.

Experimento de Reines-Cowan: detecção de $\bar{\nu}$

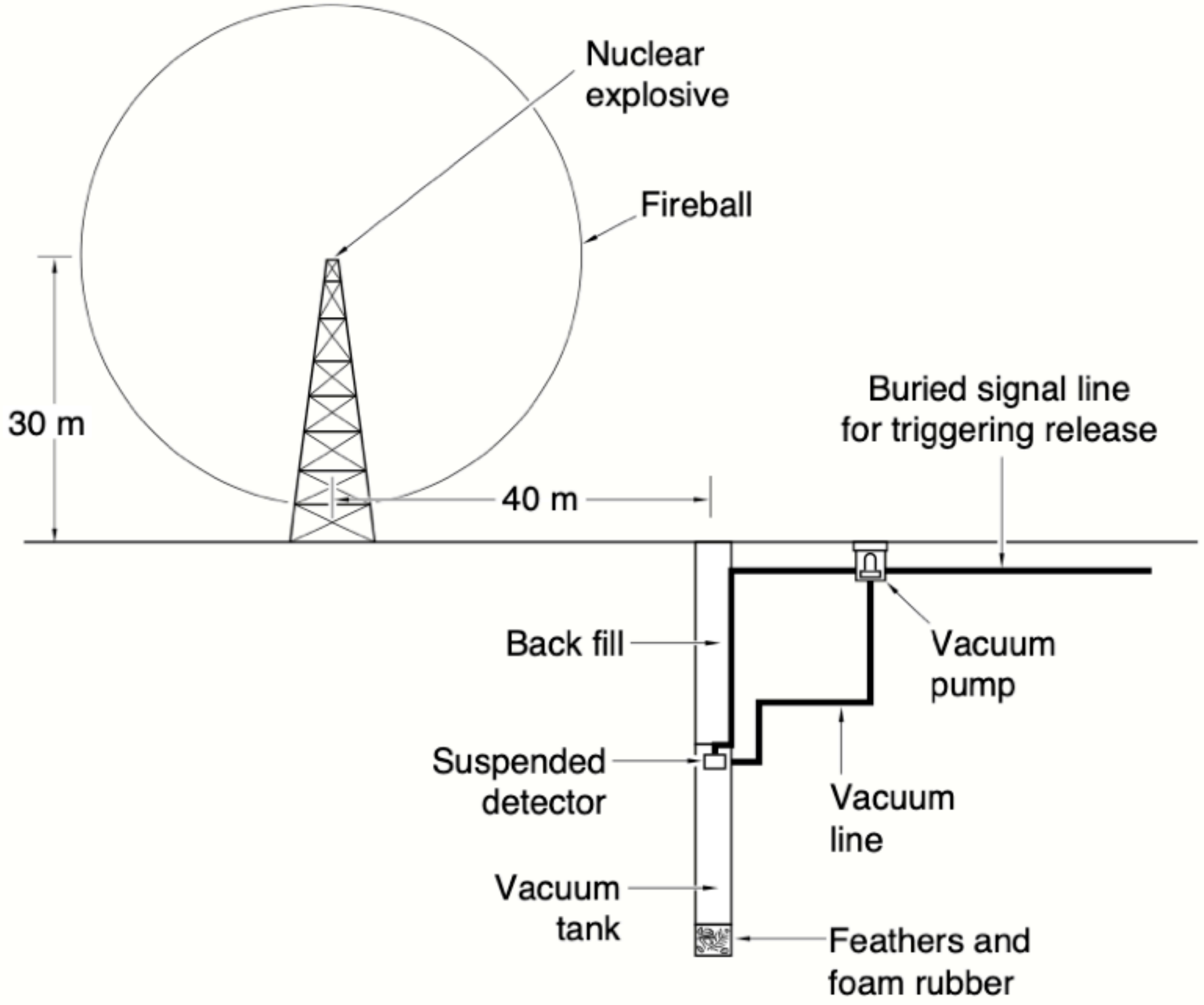

Figure 1. Detecting Neutrinos from a Nuclear Explosion
Antineutrinos from the fireball of a nuclear device would impinge on a liquid scintillation detector suspended in the hole dug below ground at a distance of about 40 meters from the 30-meter-high tower. In the original scheme of Reines and Cowan, the antineutrinos would induce inverse beta decay, and the detector would record the positrons produced in that process. This figure was redrawn courtesy of Smithsonian Institution.

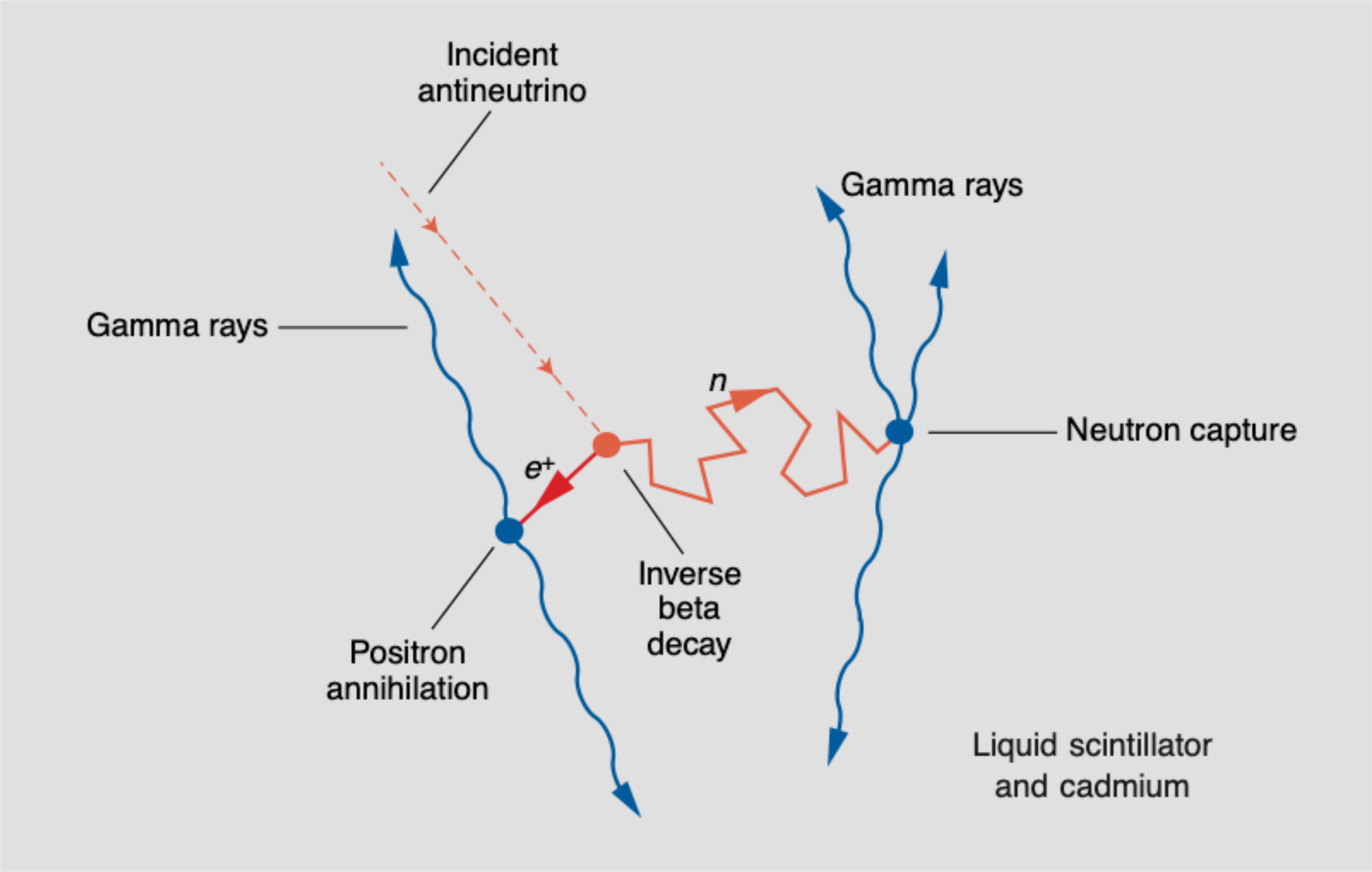

Figure 3. The Double Signature of Inverse Beta Decay
The new idea for detecting the neutrino was to detect both products of inverse beta decay, a reaction in which an incident antineutrino (red dashed line) interacts with a proton through the weak force. The antineutrino turns into a positron (e^+), and the proton turns into a neutron (n). In the figure above, this reaction is shown to take place in a liquid scintillator. The short, solid red arrow indicates that, shortly after it has been created, the positron encounters an electron, and the particle and antiparticle annihilate each other. Because energy has to be conserved, two gamma rays are emitted that travel in opposite directions and will cause the liquid scintillator to produce a flash of visible light. In the meantime, the neutron wanders about following a random path (longer, solid red arrow) until it is captured by a cadmium nucleus. The resulting nucleus releases about 9 MeV of energy in gamma rays that will again cause the liquid to produce a tiny flash of visible light. This sequence of two flashes of light separated by a few microseconds is the double signature of inverse beta decay and confirms the presence of a neutrino.