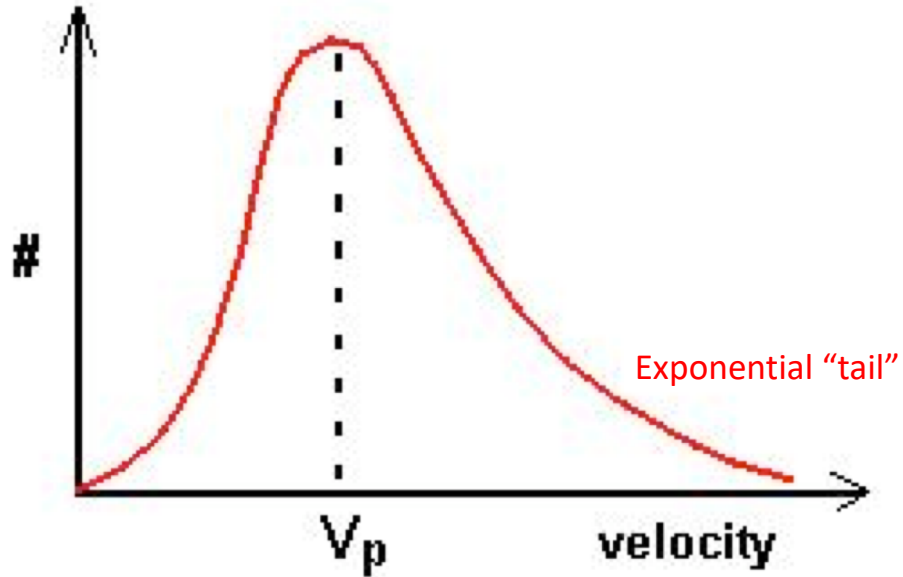


Maxwell-Boltzmann Distribution of Speeds (or Energies)

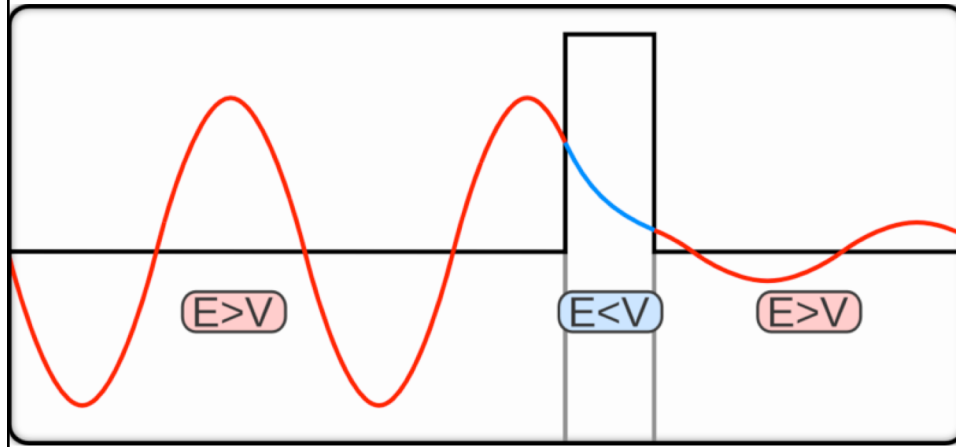


Using just classical physics, p-p fusion **SHOULD NOT OCCUR!!**



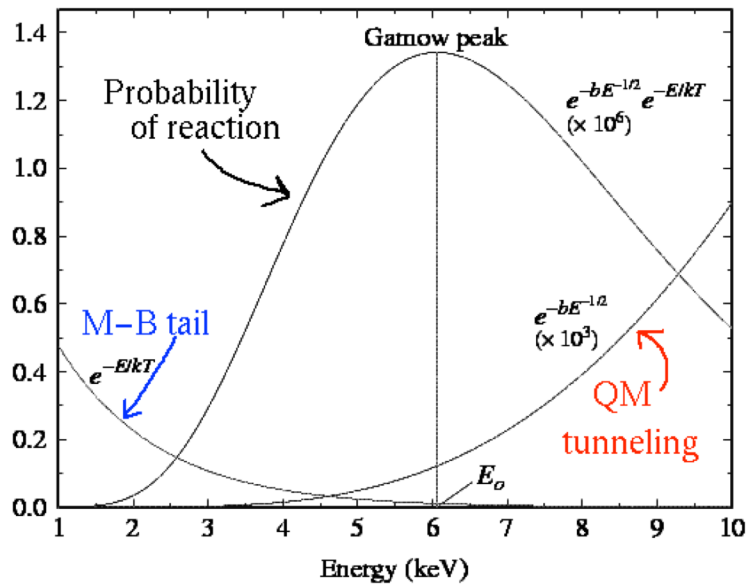
YOU SHALL NOT PASS!

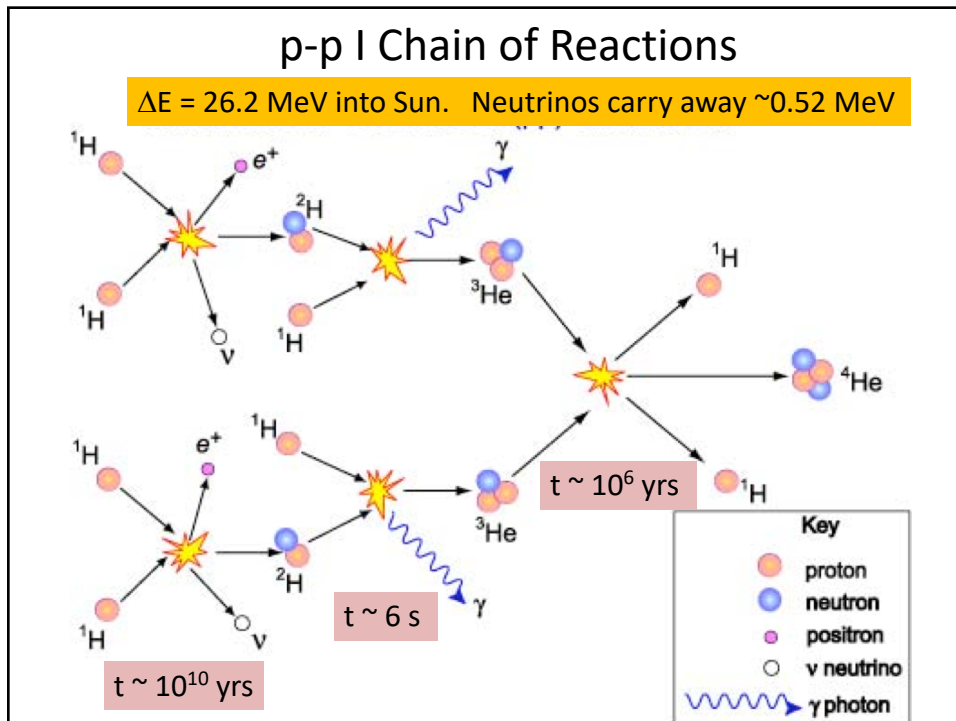
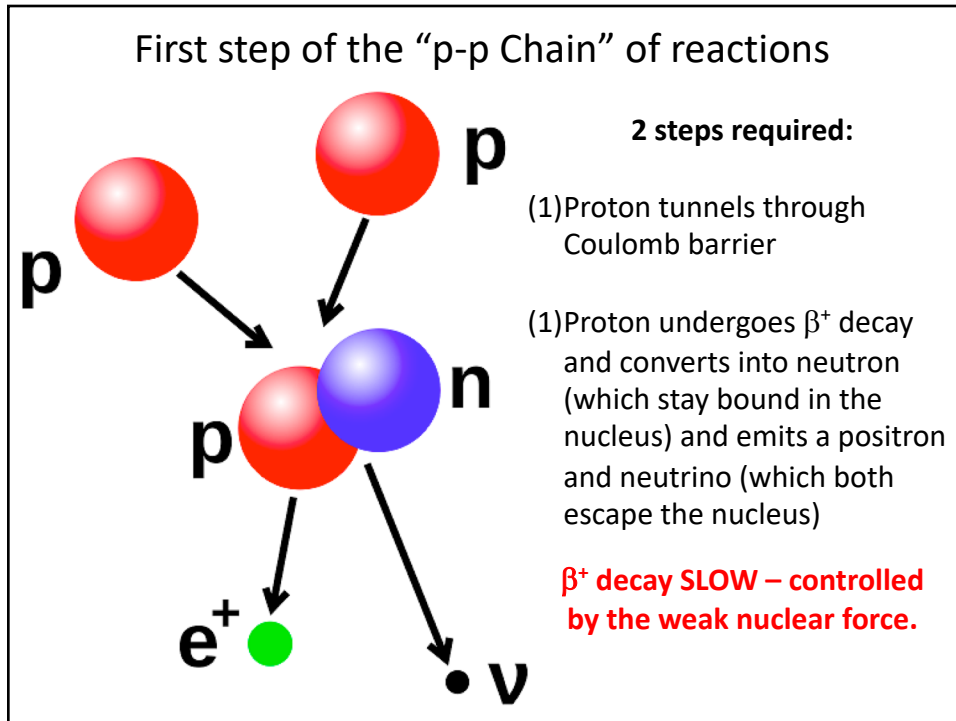
Quantum Mechanics – Tunneling!



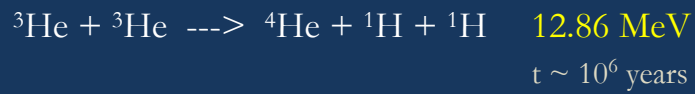
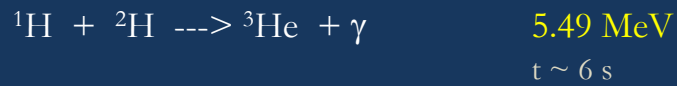
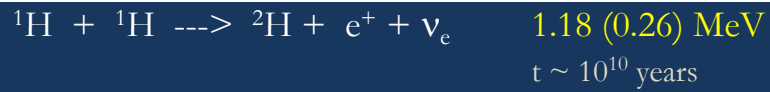
Quantum Mechanics: Particles are described by waves and the probability of finding the particle at a position is given by the square of the amplitude of the wavefunction. Solution to Schrodingers Equation indicates that a wavefunction amplitude will exponentially decay across a potential barrier.

Quantum Mechanics – Tunneling!





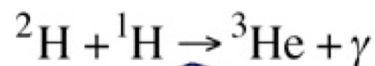
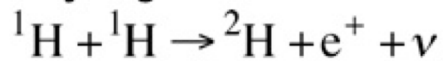
p-p I Chain of Reactions



$$\Delta E_{\text{photonic}} = 2 \cdot 1.18 + 2 \cdot 5.49 + 12.86 = 26.2 \text{ MeV}$$

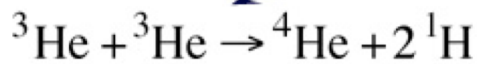
$$\Delta E_{\text{neutrino}} = 2 \cdot 0.26 = 0.52 \text{ MeV}$$

PP Chains of Hydrogen Fusion in Sun-Like Stars



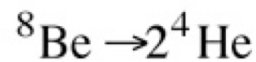
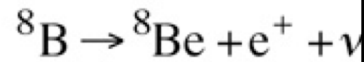
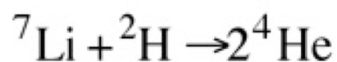
PPI ~ 69%

~ 31%



PPII ~ 99.7%

PPIII ~ 0.3%



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