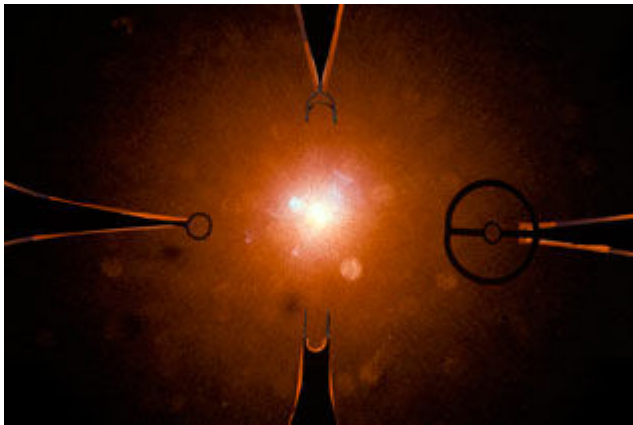


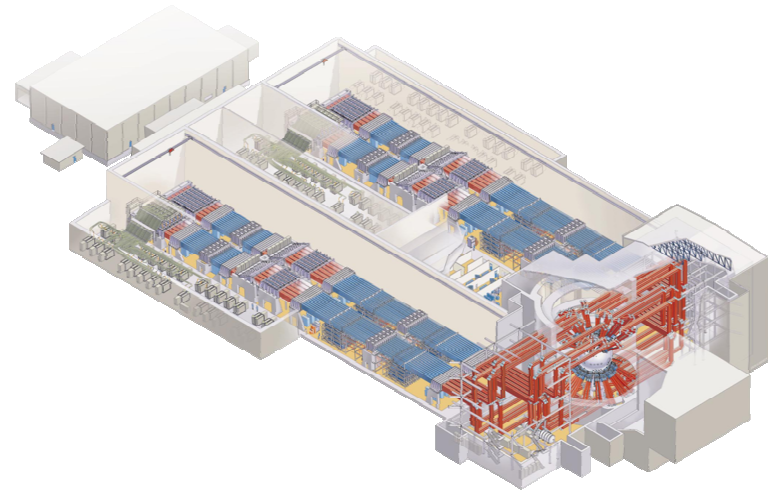
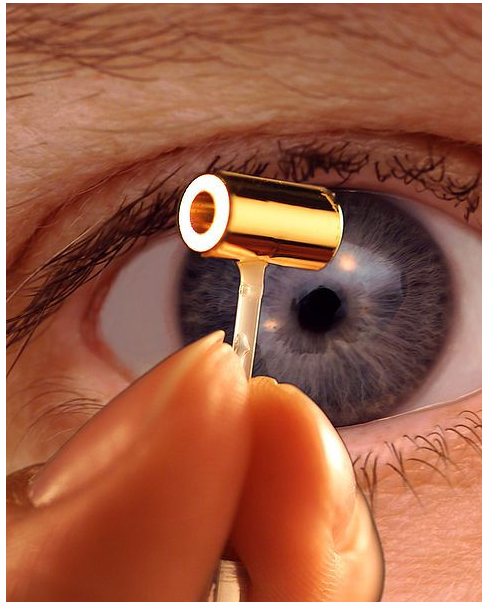
The ***Bambino***:
A Uranium Hydride Approach to
Make the NIF Successful

John Brandneburg

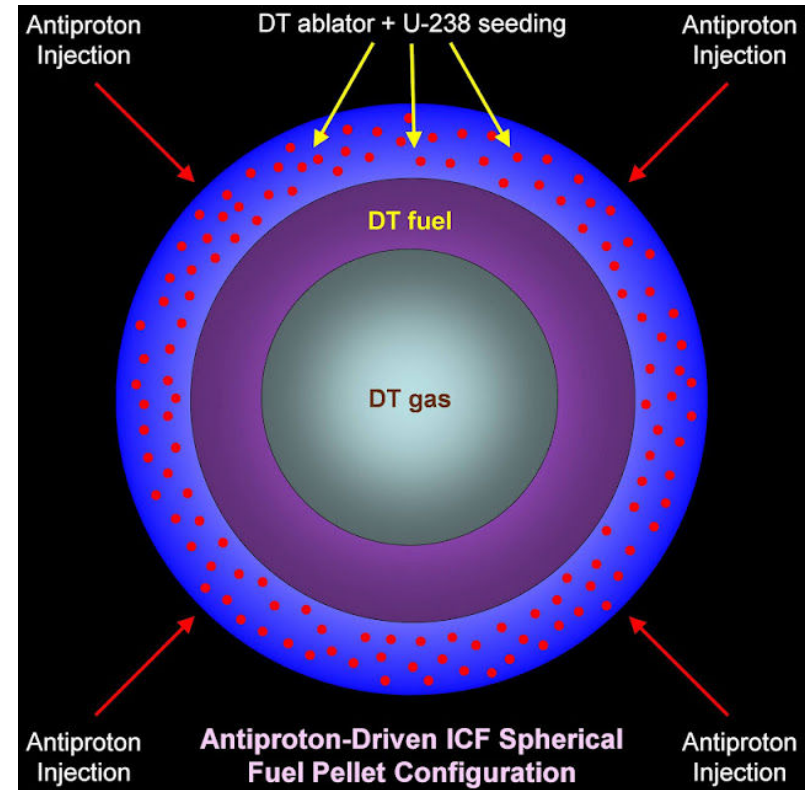
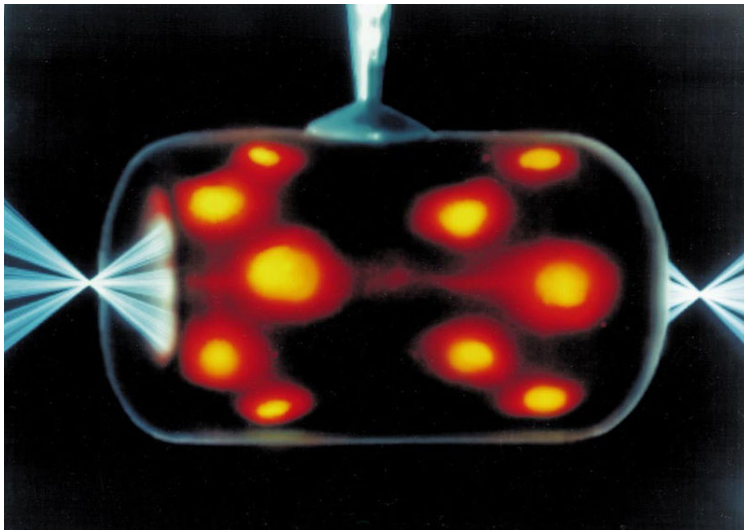


The NIF

- The NIF is supposed to ignite pure Fusion pellets using a holrahm approach
- It has so far been unsuccessful reaching only $Q \sim 1\%$ $q = \text{energy out/energy in}$



ICF pellet



Uranium Hydride weapons



Yeild = 200 tons TNT

But 1000 tons was expected.

http://en.wikipedia.org/wiki/Uranium_hydride_bomb

- Teller Concept: Mixing hydrogen or deuterium slows down the neutron to allow a smaller critical mass for uranium or plutonium

Test Produced Net Yield

- Mass disassembled faster than neutrons can diffuse so fission burn up was poor
- However, for smaller pellets diffusion can keep up with disassembly
- Reason : disassembly speed goes as

Thermal speed $V_s = (kT/M)^{1/2}$

Dissassembly time $T_d = R/V_s$

• Diffusion time $T_{\text{diffusion}} \sim (R/\delta) R/V_s$

• R = radius of pellet δ = neutron mean free path

• Obviously if $\delta \ll R$ $T_d \ll T_{\text{diffusion}}$

“Bambino” Proposal

- Compress enriched uranium-deuteride pellets instead of deuterium-tritium pellets to obtain $Q > 1$

- ***Good Luck !***

