

THE LIST OF FUSION ZEROS

by **Daniel L. Jassby**

New Jersey, USA

ABSTRACT

This article identifies ten widely anticipated milestones of fusion energy that have zero probability of being realized. The first five pertain to existing projects, while the second five concern imaginary power reactors. Four of the milestones are impossible because of physical and technological constraints, while six milestones reflect human foolishness, fantasy and deception that will not be accommodated by reality.

THE LIST OF FUSION ZEROS

TEN WIDELY ANTICIPATED (AND PREMATURELY ACCLAIMED)
FUSION ENERGY MILESTONES THAT HAVE ZERO PROBABILITY OF
BEING REALIZED

- 1) The probability that JET or any other pre-ITER tokamak will replicate JET's best 50:50 D-T performance of the 1990's is ZERO.
- 2) The probability that the National *Ignition* Facility (NIF) will actually achieve thermonuclear ignition is ZERO.
- 3) The probability that the proposed SPARC fusion device will be constructed and made operational is ZERO.
- 4) The probability that any *non-tokamak* magnetic confinement or magneto-inertial fusion device will ever demonstrate breakeven fusion energy gain is ZERO.
- 5) The probability that ITER will operate with 50:50 D-T plasmas before the year 2040 is ZERO.
- 6) The probability that a DEMO (Demonstration Fusion Power Reactor) will ever be constructed anywhere is ZERO.
- 7) Taking into account *all* on-site energy drains, the probability that any fusion reactor will ever produce *net* electrical energy is ZERO.
- 8) The probability that injected tritium burned *and lost* in a fusion reactor can be fully replenished by internal breeding is ZERO.
- 9) The probability that anyone will even *attempt* to fully replenish burned and lost tritium by internal breeding is ZERO.
- 10) The probability that any Strategic Plan to develop a fusion power reactor will ever be carried out is ZERO.

Notes on Each Milestone

The axioms referenced below are presented in the article "*Twelve Axioms of Fusion Energy R&D*," by D.L. Jassby, posted on viXra on July 13, 2020.

1) For the last 20 years, JET's recurrent program plans have always scheduled 50-50 D-T use for the year subsequent to the plan release, but tritium fuel has not been used since 1997.

2) Available laser energy per pulse is an order of magnitude too small for ignition.

3) As of this writing, the proposed SPARC test reactor has no building site, although its proponents still claim that the reactor will be operational in 2025.

4) See the Supremacy Axiom.

5) First use of D-T fuel in ITER is currently scheduled for 2035.

6) See the Delusion Corollary to the Fanciful Roadmap Axiom. Demonstration power reactors have been proposed continually since the 1960's, with the expected implementation date receding more than one year per year.

7) See the Electrical Appliance Corollary to the Axiom of Massive Electric Power Drain.

On-site electric power drains include coolant water pumping, vacuum pumping, cryogenic systems, HVAC, tritium processing systems and computer systems. Those losses are in addition to the principal drains of powering laser beams or imploding liners for ICF and MIF reactors, and powering injected particle beams, RF waves, and auxiliary magnetic coils for MCF reactors. Energy is also required for the periodic removal and disposal of radioactive reactor components.

8) See the Tritium Deficit Axiom.

9) Attempts to fully replenish tritium are supposed to be made in Demonstration Power Reactors, which will never be constructed.

10) See the Fanciful Roadmap Axiom. For more than 50 years, countless strategic plans have come to nothing.

The List of Fusion Zeros

This document was authored and submitted by Daniel L. Jassby, of New Jersey, USA.

The author may be contacted by Email at: dljenterp@aol.com