

The United States IEC Program

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Presented to

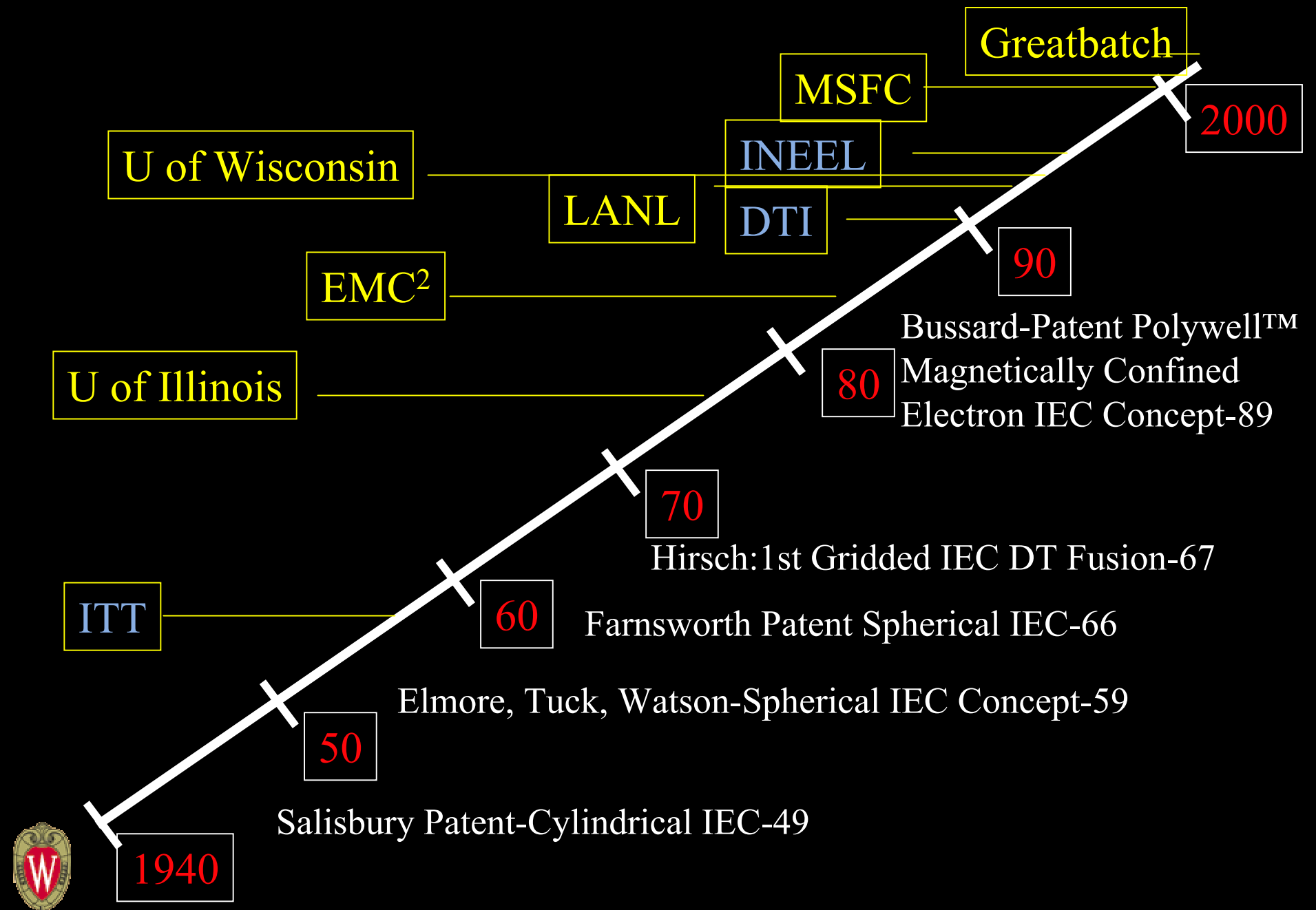
5th US-Japan IEC Workshop

October 9-10, 2002

Madison, WI



History Timeline for U. S. IEC Research



U. S IEC Laboratories

INEL
(inactive)

U of Wisconsin

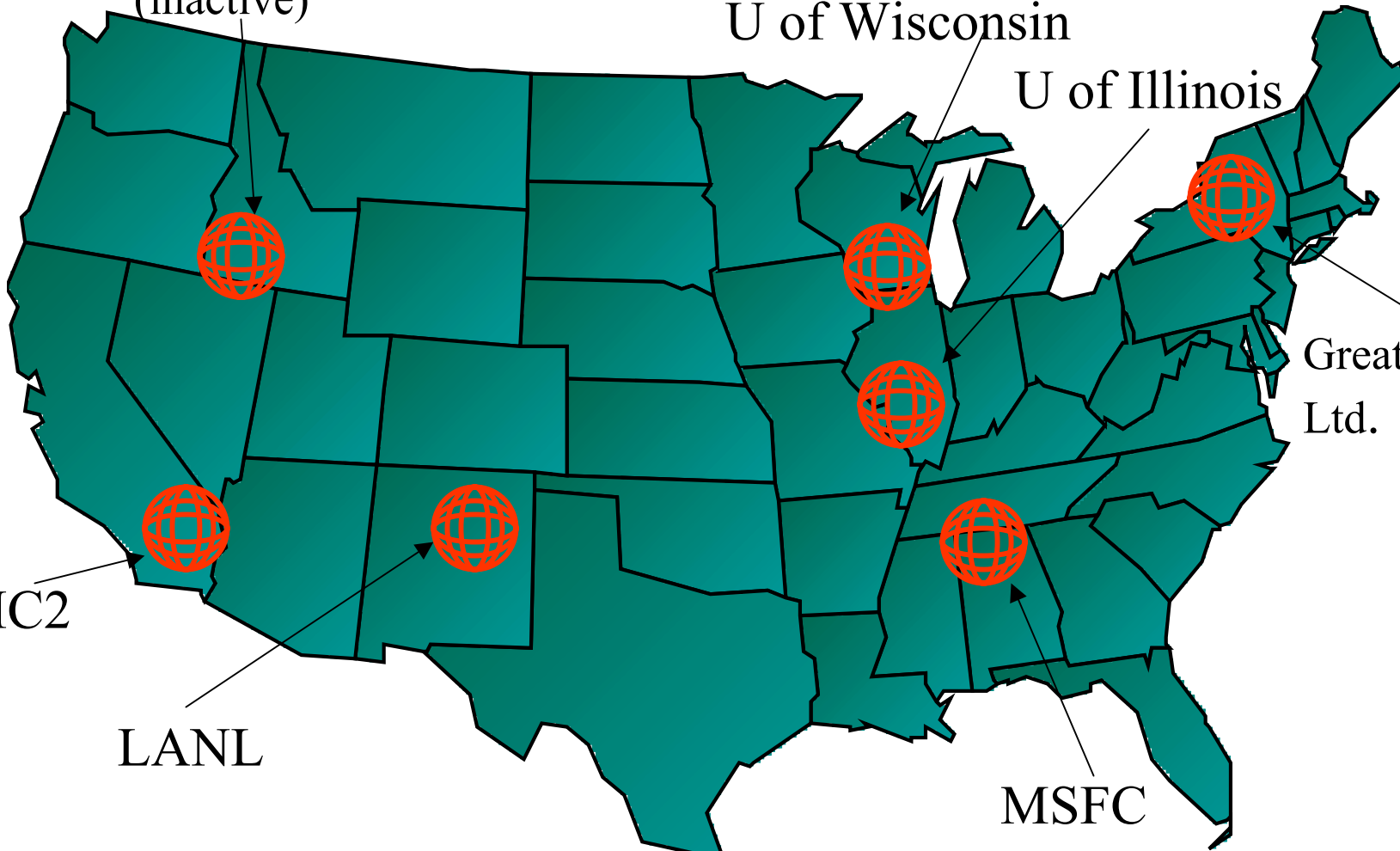
U of Illinois

Greatbatch
Ltd.

EMC2

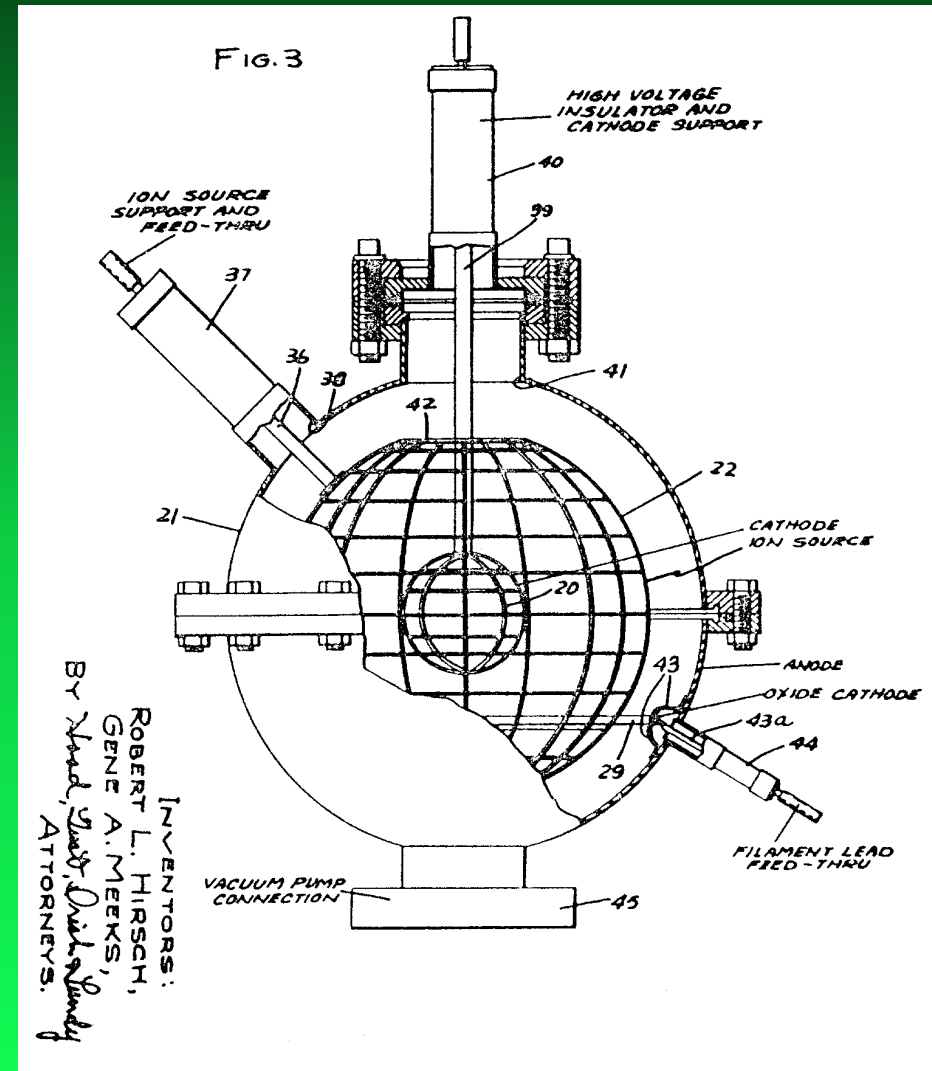
LANL

MSFC

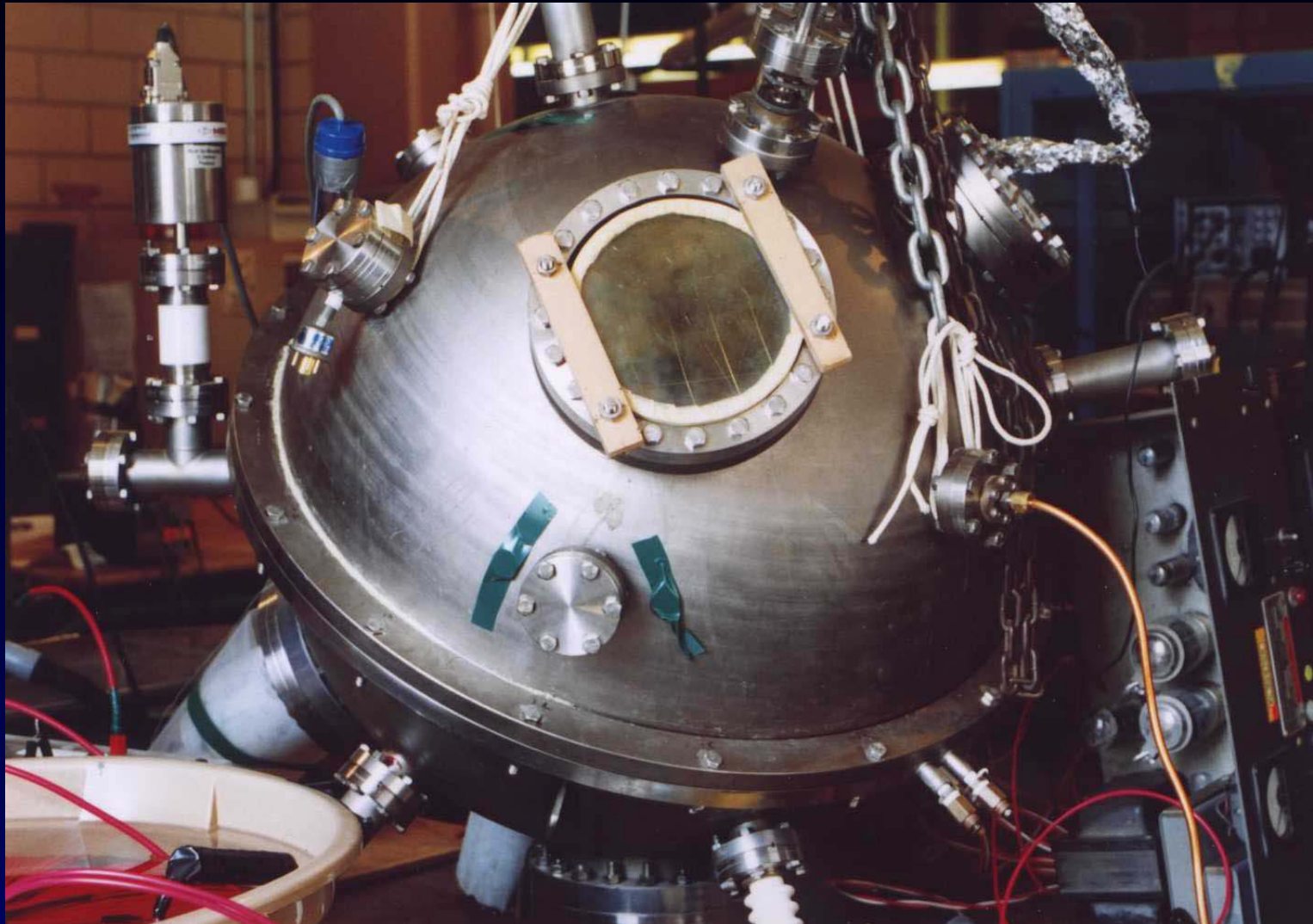


R.L. Hirsch and G.A. Meeks: Mid-60's Ion-Gun-Driven IEC Experiment

- Operated with D-T fuel
- Generated $\sim 10^{10}$ n/s



University of Illinois Facility



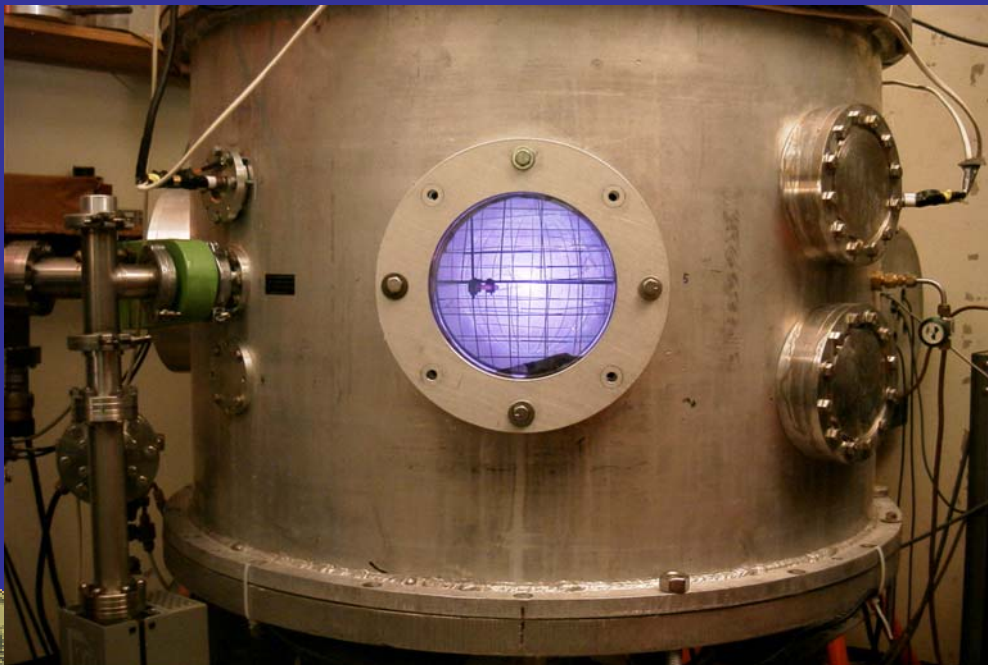
LANL Facility



MSFC Facility



UNIVERSITY OF WISCONSIN Inertial Electrostatic Confinement Research Devices



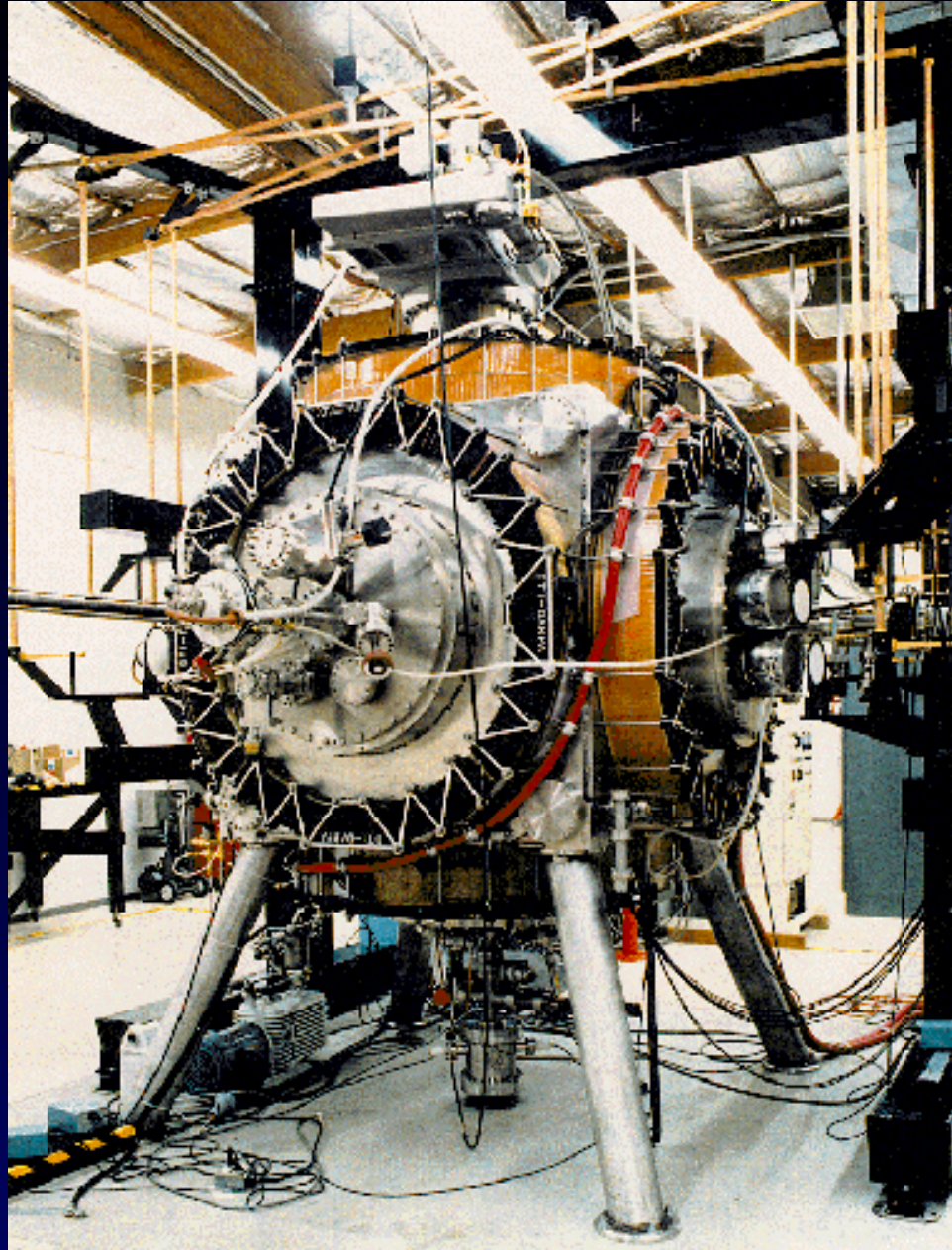
Greatbatch Facility



INEL Facility



DTI Facility





Daimler-Benz Aerospace IEC Neutron Generator



Key Features

- 10^7 neutrons/s (D-D pulse)
- Continuous output 5×10^6 n/s
- 10,000 hour operation lifetime between maintenance



IEC-PSI at 5×10^6 n/s (D-D)



Operating Regimes for Current U. S. Gridded IEC Devices

	Fuel	Upper Voltage- kV	Typical Current Range-mA	Typical pressure -mTorr	Operating Devices (#)
U of Illinois	DD	80	10-100	1-10	Sph (3) Cyl(1)
LANL	DD	75	50	≈10	Sph (1)
MSFC	DD	80	30-50	5-10	Sph(1)
U of Wisconsin	DD D ³ He	160	30-60	0.5-3	Sph(2)



Current Directions

	Faculty/ Scientists	Students	Main Thrust	Applications
U of Illinois	4	5	DD, Pulsed, Cylindrical	Detection, Propulsion, Electricity
LANL	2	0 (2 summer)	POPS	Detection, Electricity
MSFC	2	0	Grid Design	NAA, Propulsion,
U of Wisconsin	3	6	Advanced Fuels	Isotopes, Detection, Electricity

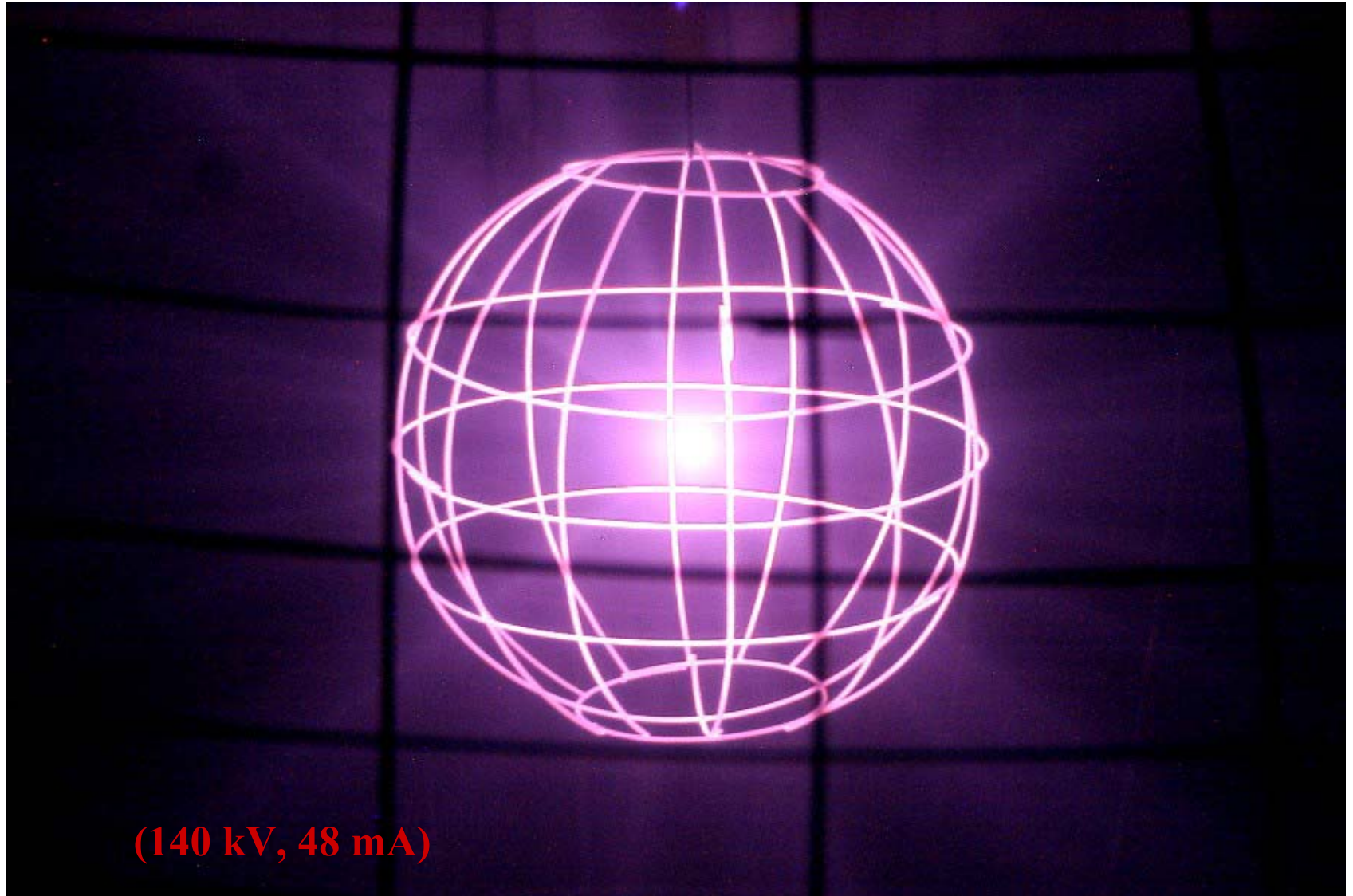


Where is IEC Research Going in the United States?

- Near term applications
- Propulsion
- Electricity
- Hydrogen
- Waste transmutation.



The Steady State D-³He Fusion Rate in the UW IEC Device is Now at the Level Where Isotope Production is Feasible



(140 kV, 48 mA)



What is the Future of IEC Support in the United States?

- Role of Industry?
- Role of Federal Government?
- Role of Utilities?
- Role of Universities?

