

Summary report: ‘Introduction to Cold Fusion’ – IAP course at the Massachusetts Institute of Technology, USA

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For three years running now, the Massachusetts Institute of Technology (MIT), USA, has offered the introductory cold fusion course during its Independent Activities Period (IAP), designed for students to engage in topics outside-of-the-normal-curriculum; enrollment is open with permission from the instructor, and there is no advance registration required. IAP at MIT, for those not familiar with it, is a special four-week programme where students can choose from a vast array of non-credit and for-credit short course-work offered only during January of each year. CF-101 is a non-sign up, non-credit introductory course, open to MIT and non-MIT students alike, as well as the public. Peter Hagelstein, Professor of electrical engineering at MIT has been teaching the course with Mitchell Swartz, from JET Energy, Inc. In some years the CF/IAP classes extended over two weeks; at other times over several days.

Keywords: Cold fusion, course work, independent activities period.

WHILE the Massachusetts Institute of Technology (MIT), USA, officials still reportedly do not recognize cold fusion or its viability, the fact that it has entered the academic domain, albeit through the less-structured IAP agenda, is certainly noteworthy, both for those scientists working for its public acknowledgement and for the appearance of a place to go and get an education in this field. Twenty-five years later, one can now walk into an MIT classroom, listen to an academic lecture on the subject, and learn that the phenomenon is real and reproducible.

Following is a brief summary of what is typically covered in the course:

- Excess power production in the Fleischmann–Pons experiment.
- Why CF/LANR is so important, including its energy density.

- Reasons for lack of confirmation in early negative experiments.
- Analysis and errors of Huizenga’s ‘three miracles’.
- Experimental evidence for the existence (and development) of cold fusion.
- Physical chemistry and electrochemistry of PdD.
- Metallurgic structures of loaded palladium and nickel hydride lattice.
- Loading requirements for CF/LANR activity and excess power production.
- Method of, and difficulties regarding, loading metals with hydrogen isotopes.
- Unwanted roles of dislocations and cracks in quenching desired reactions.
- Codeposition experiments enabling improved loading rates.
- Methods of calibration of heat-producing reactions and systems.
- Excess power in the aqueous nickel and palladium hydride systems.
- Piantelli experiments.
- Activation energies required to get the desired reactions.
- Survey of ‘heat after death’ reactions and their control.
- Emissions as excess energy is obtained from CF systems.
- One- and two-laser irradiation experiments.
- Nanomaterials in CF/LANR.
- Electrical transconduction and breakdown (avalanche) issues.
- Overview of theoretical approaches.
- The nuclear ash problem and He-4 observations.
- Helium (⁴He) production rates in quantitative agreement with the XSE.
- Rate of ⁴He production is commensurate with the observed excess power.
- Nuclear screening in PdD.
- PdD as an energetic particle detector.
- Constraints on the alpha energy from experiment.
- Coherent energy exchange between mismatched quantum systems.
- Coherent X-rays in the Karabut experiment and interpretation.

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- Role of electron density in the lattice and at vacancies.
 - Vacancy stabilization by H or D addition.
 - Importance of the role of deuteron flow (flux).
 - Impact of helium occupancy at important choke-points in the lattice.
 - Division of the 24 MeV energy of freshly made helium into smaller energy quanta.
 - The role of phonons (lattice vibrations) and critical phonon modes in the lattice.
 - Cold fusion/LANR Hamiltonian and the role of orbitals of hydrogen.
 - Spin boson model and the role of destructive interference, loss and dephasing issues.
 - Control of loading achieved by an applied electric field intensity.
 - Optimal operating point manifolds to control, and determination of the products of CF/LANR.
 - The future of CF/LANR.
 - Metamaterials, a major improvement of CF systems.
 - CF/LANR engines to generate electricity.
- Prospects for a new small-scale clean nuclear energy technology.

Some of these lectures are available on YouTube – <http://www.youtube.com/watch?v=gMx1mpcokBk> and <http://www.exposingthetruth.co/mit-scientists-discover-secret-cold-fusion/>

In addition, the full set of lectures of the January 2014 course is available at: <http://coldfusionnow.org/interviews/2014-cflanr-colloquium-at-mit-full-coverage/>

At the beginning of the January 2013 course, for example, Room 4-153 in the Electrical Engineering building, was nearly packed with a blend of about 35–40 students, entrepreneurs, engineers, physicists, and ‘curious’ members of the community, as the class size ebbed and flowed throughout the six-day event. Attendees came from as far away as Spain, China, Germany and Switzerland. But they also travelled from California, Pennsylvania, New York and throughout Massachusetts. Many thought the course was ‘great’ and said they were glad they came. If others disapproved, no one said so publicly.
