DEAR WOLFGANG,
THIS IS THE NEXT PART OF THE STORY AT CEARN. AS YOU CAN SEE, IT BECOMES MORE SERIOUS AND THE IPP MIGHT BE INTERESTED.

MARC

Dear E632 and WA84 Collaborators, 13 April 1989.

COLD FUSION NEWS No 6

In the history of cold fusion, we seem to have passed phase one where
(1) preprints of the original two Utah experiments have become available for study and are often considered to be hastily written accounts of work that has been done with few controls and is described with so few details that it is difficult to judge the truth or falsehood of the results
(2) press reports of experiments claiming to confirm these results but descriptions are not available to the scientific community.

Now we are in phase two where we do not need more press releases but experiments with good measuring devices and serious controls that would convince other scientists. In working on cold fusion, one is quickly aware of the great knowledge gap between electrochemists and particle physicists and also the different cultures and jargon. An ideal team would include both electrochemists and particle physicists.

A major criticism of the neutron measurements, particularly by Tom Walsh, is that the counting rates are close to the cosmic ray rate. If this background could be reduced by a few orders of magnitude, then any neutron signal would be unequivocally established. Such a neutron detector with a very low background has been developed by the groups of the Institut des Sciences Grenoble, College de France Paris, CPPM Marseille, Saclay, and LAPP Annecy at the Bugey Reactor centre near Lyon in the course of studies of neutrino oscillations where a low background has been found to be esential. It is always dangerous to say something is the best in the world, but this is one of the best.

Dr. Cary Miller has make an electrolytic cell at the EPF Lausanne with a palladium rod of 0.18 cm diameter and 5 cm length and has been running it for 8 days for calorimetric measurements. This morning we took it to Bugey (this is the first time I have had a running experiment small enough to fit in my car) and installed it inside the shielding of the Bugey neutron counter. After a few hours running, already a neutron rate could be established substanially below the Jones at al. rate and several orders of magnitude below the Fleischmann and Pons rate and this is a very conservative estimate which will soon be improved. The shielding is such that the total background rate was about 1 E2 per hour and this was before discrimination between neutrons and other particles. When the veto against muons was removed (it is only on a few percent of the time), the background increased and signs of neutrons could be observed (stopping negative muons are known to produce neutrons via the decay electrons which interact with protons to give neutrons).

There is considerable space inside the shielding of this detector and the constructors (IN2P3 and CEA) invite any groups that have electrolytic cells wishing to study cold fusion to come to Bugey and make use of the detector. Please contact Dr. Yves Declais at LAPP Annecy, Email address;
LAPPVX::YD

Earlier versions of the detector and of the pulse shape discriminator are described in R. Aleksan et al. NIM A273 (1988) 303 and NIM A274 (1989) 203. The shielding has an outer layer of 10 cm of lead to reduce gammas, 25 cm of water to slow/stop neutrons, then 5 mm of a plastic containing boron to absorb the slow neutrons and on the inside 10 cm of liquid scintillator which counts muons mainly and is normally used as a veto (in our case we wish also to see if muons can cause more neutrons by muon fusion catalysis - Dr. Petitjean of SIN who is an expert on muon catalysis, has confirmed what was written in note No 4, that muons are expected to be unable to cause many fusion catalysis reactions as they will be captured by the heavy palladium ions and held strongly). Inside this large shielding box, there is the detector of 600 litres consisting of 98 cells which contain 6Li in the new liquid scintillator NE320. The slowing of the neutrons gives recoil protons and the signal amplitude is correlated to the neutron energy. When the neutron stops it reacts with 6Li to give tritium and 3He and the height of this gnal is also measured. The distribution of the times between these two signals is used to determine the fraction of neutrons as the relation between the heights of the two pulses so that a discrimination is possible between protons and electrons.

This Collaboration also offers space in the Frejus tunnel to any group who would like to make use of the low background level and large amount of space available there. Again please contact Dr. Declais.

Have received messages telling me that as well as Texas A and M confirming the calorimetric measurements of Fleischmann and Pons, Georgia Tech report a neutron flux 13 times higher than background - it would be good to wait and see more details.

In discussing this morning with Prof. Michael Gratzel and Dr. Cary Miller of the Ecole Polytechnique Federal of Lausanne, I learnt the importance of the footnote c to table 2 of Fleischmann and Pons's paper - these high values of the excess heat as % of the break-even, are not directly measured but assume a possible future scheme in which the deuterium gas released is not lost but recombines with the hydroxyl radical OD to give heavy water D2O.

Douglas R. O. Morrison