Live Open Science (LOS), a Good Fit for LENR Research

As Practiced by the Martin Fleischmann Memorial Project (MFMP) at QuantumHeat.org

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With many thanks to the innumerable contributors and followers, also, via www.QuantumHeat.org

**MFMP MISSION**
- Replicate LENR experiments openly
- Provide open access to all data and entire process to assuage skeptics
- Distribute and promote replicable experiments
- Help overcome institutional bias against the field

It really comes down to promoting a cultural change to allow a reasonable investment in LENR research.

**Open Science Trends**
There are several new Open Science initiatives, recently
- Mozilla Science Lab - SciStarter.org
- OpSci.org - OpenScienceFramework.org

Open Source Software is the most powerful force in the evolution of the internet. The goal of science is to develop and share knowledge. Doing it openly and rapidly is a natural.

**LOS Benefits**
- Faster feedback and shorter iteration time
- Early and dynamic exchange of ideas and designs
- Improvements suggested from many observant, diverse minds
- Greater accountability, less chance of falsification
- Experiment details better conveyed
- Results are available to other researchers immediately
- More research per dollar with help from enthusiasts

**Traditional Science Process**
- Ask a question
- Do Background Research
- Construct a Hypothesis
- Design an Experiment to Test Hypothesis
- Analyze your data draw conclusions
- Report Results

Typically all done within one lab or one team

*Peer review before publication*

**Live Open Science Process - Harnessing the Power of the Crowd**
- Ask a question
- Do Background Research
- Construct a Hypothesis
- Design an Experiment to Test Hypothesis
- Analyze your data draw conclusions
- Report Results

Feedback long after experiment

*Submit for standard publication with more confidence*

**Experiment Log**

*Streaming Data*

**Blog on Website**

*Comments on Blog*

**Discussion Forum***
The task is to make people understand what it is that is being done. **Communication is the key to science.**

### Scientific Paper Sections

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<th>Section</th>
<th>LOS Project Sections</th>
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| Introduction | - Experiment Intro Document/Blog Entry  
- Hyperlinks to previous work and relevant info  
- Google Docs are great tool for this  
- Citations to pertinent papers |
| Materials and Methods | - Experiment Design Requirements Document  
- Drawings, Photos, Videos  
- CAD Drawings,  
- Wiring diagrams,  
- Plumbing diagrams,  
- Bill of Materials  
- Links to vendor spec sheets  
- Protocol Plan |
| Results and Discussion | - Live Streaming Data / Archived Raw Data  
- Real time Experiment Log  
- Published Spreadsheets for Review  
- Blog posts on significant interpretations  
- Feedback, data analysis from observers |
| Conclusion | - Capstone blog Entry  
- with criticism and suggestions in comments |

### User Contributions Experienced

- Design critiques - engineering suggestions  
- Experimental flaws exposed early  
- Mentorship from many senior scientists  
- Data watching and rapid analysis  
- Custom software offered, commissioned for us  
- Useful links to all sorts of resources and information  
- New individuals and teams have been inspired to do experiments

### Practical Considerations

- Many of the world's best and brightest are willing to help because it makes them feel good  
- Requires a lot of time keeping up with comments  
- Try to ask specific questions or request specific tasks  
- Must be willing to accept criticism  
- Must assimilate input and adopt worthy ideas  
- Maintain balance between original protocol and incorporating sound suggestions  
- Communicate clearly to prevent immediate and incorrect conclusions being propagated  
- Accept that not all of your questions can be addressed  
- Frequently offer gratitude and recognition for volunteers, contributors and their contributions

### LOS and Intellectual Property

Open research makes IP protection invalid and venture investment unlikely. Despite the lack of proprietary IP, private companies may contribute to the research effort because it will help them achieve their overall goals. An openly developed technology platform can serve as a launching point for a range of companies to develop upon and whole new industries to spring up. An Open Science license may be key to LOS continuing.

### The Topics

The enthusiasm engine will run best on research topics that are clearly needed and important to a wide range of people. LENR is a perfect topic for energizing a crowd of supporters because energy generation is something everyone can see the use in. There are enthusiast groups for every niche, though, that can add insights and energy to your project.

### A Journalist on the Team

Because communication is the key, a good LOS team needs more than good scientists, it requires a journalist. LOS is an engine that runs on the enthusiasm of the crowd. To keep the enthusiasm high, the story of your research has to be compelling and frequently updated. Much like on reality based TV shows, your journal should include your setbacks, your triumphs, and your puzzlers.