The Design of a Low-Energy Nuclear Battery (LENB)

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Nano Fusion Design

1. Author Profile

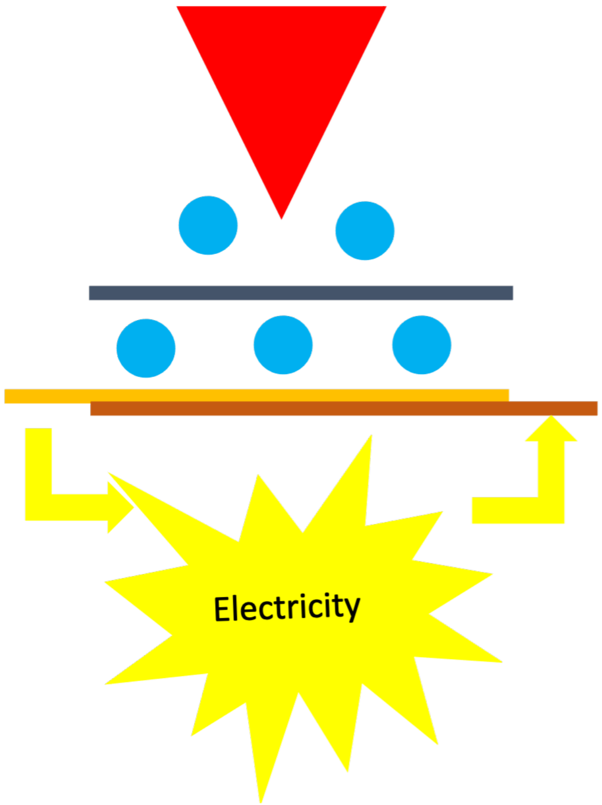
Ryoji Furui, Independent Researcher

- Received a Bachelor of Business degree from Yokohama National University in 1997.
- Documented nuclear fusion in a short letter (2007) and an essay (2014) and developed reactor designs (2022–present).
- Has had a variety of job experiences, including creation of music and art, and follows a “futen” (hippie) lifestyle.
- Currently lives in the mountains and is cultivating hops.

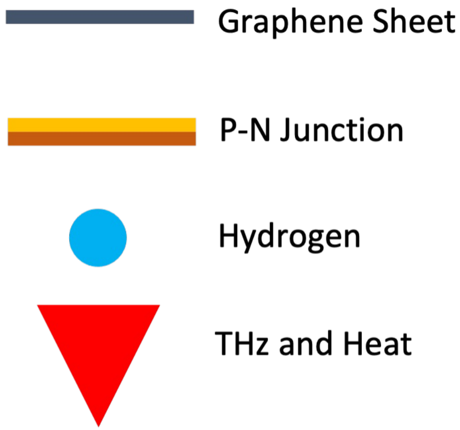
Nano Fusion Design

- Obtained the domain name “nanofusion.design” in November 2022.
- Currently designing the core component of a fusion reactor.
- The project is open source and does not hold any patents. Plans are underway to create a community space at the LENB.org website.

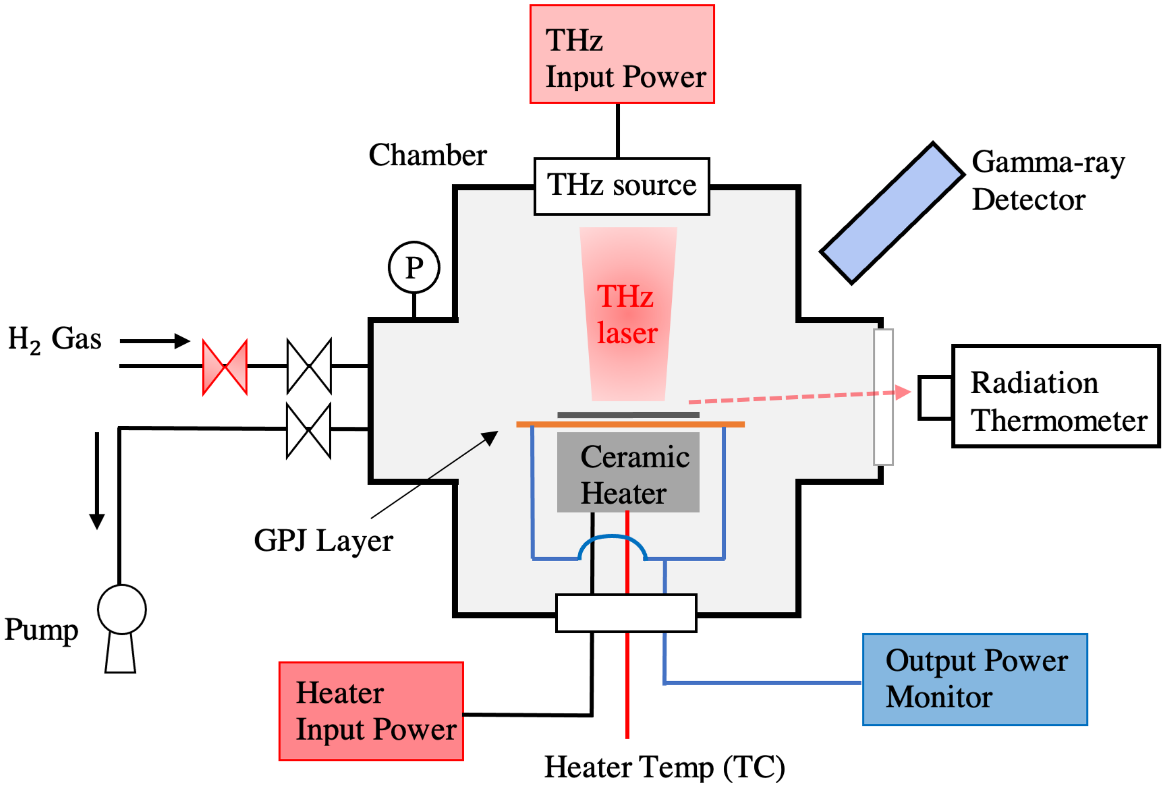
2. Core Design of the LENB



- Extracts electricity rather than generating heat.
- Miniaturized components to be simplified and ordered on the nanoscale.
- Incorporates the latest developments in materials science.



3. Experimental Setup (Plan)



- Generate electricity?
- No baking or pretreatment.
- Three key parameters
  1) Core temperature
  2) Gas pressure
  3) THz frequency
- Start with micro-scale materials.
- Obtain static data to understand the low-energy nuclear reaction (LENR).

4. Theoretical Assumptions

1) Excitation with THz radiation creates plasmons on the graphene surface.
2) Hydrogen atoms are condensed within these plasmons.
3) In the plasmons, protons capture electrons.
4) Ultra-low momentum neutrons fuse with either the protons or each other.
5) As a result of this process, one of the neutrons emits an electron through beta decay.
6) The emission of electrons then generates electricity on a P-N junction via an electron-beam-induced effect.
7) Additionally, a low-energy proton-proton (LEPP) chain reaction may occur.

5. LEPP Chain Reaction Process

- The LEPP chain reaction is a significant and desirable reaction that occurs on the graphene surface. This reaction process involves four steps:
  1) $\mathrm{p} + \mathrm{e}^- \rightarrow \mathrm{n} + \nu_\mathrm{e}$; electron capture
  2) $\mathrm{p} + \mathrm{n} \rightarrow \mathrm{d} + \nu_\mathrm{e}$; $\mathrm{n} + \mathrm{n} = \mathrm{d} + \mathrm{e}^- + \bar{\nu}_\mathrm{e}$; deuterium production
  3) $\mathrm{d} + \mathrm{n} \rightarrow {}^3\mathrm{He} + \mathrm{e}^- + \bar{\nu}_\mathrm{e}$; helium-3 production
  4) ${}^3\mathrm{He} + \mathrm{n} \rightarrow {}^4\mathrm{He} + \nu_\mathrm{e}$; helium-4 production
- The resulting mass deficit is fundamentally converted into gravitons, which are massless particles that carry kinetic energy. When gravitons collide with particles that have mass, they transfer their kinetic energy to the particles with mass. As a result, when gravitons collide with charged particles, electromagnetic radiation (such as gamma rays) is emitted. This is why we do not observe gamma rays in lower-energy fields, such as that of an LENR.

6. Two Possibilities of the plasmons with Low-Energy Protons

I. Stopping Power:

1. Low-energy protons on the surface of plasmonic graphene are trapped by an electron flow in one direction, appearing as if ionized protons moving quickly in electron clouds.
2. As a result, the protons assume a lower energy state, behavior similar to ionized particles.
3. In weaker plasmons, protons can exchange potential energy with individual free electrons temporarily as they pass through the range where the K orbit electron resides.
4. In more excited plasmons, protons simply share potential energy with all surrounding free electrons within a wider range equivalent to a single electron in total.

II. Electron Capture:

1. Electrons flow in the right direction to the protons within the range where electron capture occurs.

7. Intellectual Property (IP) Policy

- Nano Fusion Design follows an open-source IP policy and does not hold any patents.
- All IPs have been deposited on the GitHub platform, which is a popular open-source software repository. They can be found at http://github.com/nanofusion
- We only collaborate on non-confidential matters.
- We have obtained the internet domain LENB.org for the open-source community, where IPs will be stored on a blockchain-like network system to preserve and authenticate their decentralized ownership.

8. Collaborative Processing with IP Policy

<table>
<tr><th>Phase</th><th colspan="2">Proof of Concept</th><th colspan="2">Production</th></tr>
<tr><td>IP Policy</td><td>Open Source</td><td>Patent-free</td><td>Open Source</td><td>Patent-free</td></tr>
<tr><td>Nano Fusion Design</td><td rowspan="2">Yes</td><td rowspan="2">Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Collaborators</td><td>Yes or No</td><td>Yes or No</td></tr>
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- If Nano Fusion Design (NFD) collaborates with companies or institutions (collaborators), NFD wishes to publish a paper or report on the proof of concept with an IP policy of open source and patent-free.
- In the production phase, NFD will continue to follow the IP policy of open source and patent-free, but collaborators will have the option to choose a different IP Policy.
- To address the energy crisis, it is crucial to establish requisite IPs as open source and patent-free, in order to facilitate rapid development of technologies for LENB.

9. Regulations and Social Impact

- International regulation will be essential to ensure the safety of consumers and small laboratories, along with large-scale production facilities.
- The regulatory framework will cover subjects ranging from general battery production to nuclear materials handling.
- Comprehensive studies of the social impact of this development will be required to ensure smooth transitions to the new energy sources.