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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 16/349,402 | 05/13/2019 | Leif HOLMLID | 14003-000163/US/NPA | 3868 |

112467 7590 02/24/2021

RMCK Law Group, PLC
PO Box 210280
Auburn Hills, MI 48321

| EXAMINER |
|---|
| WASIL, DANIEL D |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3646 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 02/24/2021 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gail@rmcklaw.com
mailbox@rmcklaw.com
michelle@rmcklaw.com

| Office Action Summary | Application No. 16/349,402 | Applicant(s) HOLMLID, Leif | |
|---|---|---|---|
| | Examiner Daniel Wasil | Art Unit 3646 | AIA (FITF) Status Yes |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☑ Responsive to communication(s) filed on 13 May 2019.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5) ☑ Claim(s) 1-14 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-14 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

**Application Papers**

10)☑ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☑ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☑ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 5-13-2019.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

## DETAILED ACTION

### *Notice of Pre-AIA or AIA Status*

**1.** The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

### *Response to Amendment*

**2.** An amendment was filed 13 May 2019. Claims 1-14 are pending.

### *Claim Rejections - 35 USC § 112(b)*

The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

**3.** Claims 1-14 are rejected under 35 U.S.C. 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor regards as the invention.

Claim 1

It is unclear what constitutes "ultra-dense hydrogen". It is unclear what constitutes an "ultra-dense state" of hydrogen. The dividing boundary between ultra-dense and non-ultra-dense is undefined and unknown. The claims do not allow the public to be informed of the required definite boundaries. Rather, the boundaries of what would constitute infringement are unknown.

The claim format makes it is unclear which components are part of the accumulator. For example, it is unclear whether the accumulator includes each of the "inlet", "outlet ", "hydrogen transfer catalyst", "accumulating member", and "field source". In other words, it is unclear whether any of the components (e.g., the "field source") are separate from the accumulator.

### *Claim Rejections - 35 USC § 112(a)*

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

**4.** Claims 1-14 are rejected under 35 U.S.C. 112(a) as failing to comply with the enablement requirement. The claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The invention is stated [0020] to be based on generating muons by accumulating ultra-dense hydrogen, and subjecting the accumulated ultra-dense hydrogen to a perturbing field (such as an electromagnetic field, including purely electric or magnetic fields).

The invention is directed to an apparatus for generating muons. The apparatus (e.g., claim 1) is defined to include in particular an "ultra-dense hydrogen accumulator", in which a "hydrogen transfer catalyst" is arranged within a "flow path" of the

accumulator and causes a "transition of hydrogen from the gaseous state to an ultra-dense state", and a "field source . . . adapted to stimulate or induce emission of negative muons from hydrogen in the ultra-dense state". It is noted that this subject-matter does not further define:

I. the ultra-dense hydrogen state;

II. the specific material of the hydrogen transfer catalyst;

III. the nature of the field source; and

IV. which technical apparatus features make this field source adapted to stimulate or induce the negative muon emission.

Because all this information is missing, it is not clear which corresponding features are intended to be covered by this wording. Thus, the disclosure is non enabling and inoperative, and would not enable the skilled artisan to make and/or use the recited invention.

The application does not provide any experimental evidence for the actual obtainment and accumulation of such ultra-dense hydrogen within such a device, with for example no information or measurement about temperature and density of such state. Also, the application does not include any detailed, step-by-step method of how to operate the device (e.g., Figure 2) in order to indeed generate such ultra-dense hydrogen state. Nor does the application explain why the hydrogen atoms are prevented from re-forming covalent bonds. Nor does the application explain how ultra-dense hydrogen can be absorbed by a metallic absorbing member. The application is absent a detailed explanation of how negative muons are emitted from ultra-dense hydrogen. Given the lack of parameters and boundary conditions (e.g., operating

temperature, densities, dimensions, impurities, material composition, material structure regarding arrangement of atoms, etc.) set forth in the specification, one skilled in the art would not be able to repeatedly reproduce or understand the alleged nuclear fusion reactions.

Furthermore, as best understood, it appears that the alleged ultra-dense hydrogen state merely represents a sort of "desiderata" for obtaining nuclear fusion, since the ultra-dense requirement is attempted to be defined through the nucleus-nucleus distance as being considerably less than 50 picometers [0009], i.e., exactly the condition result obtained once the Coulomb forces between nuclei have indeed been overcome, so that fusion can indeed occur.

The examiner contends that Applicant's invention relies on an “ultra-dense hydrogen” concept. However, there is no reputable evidence of record to support the assertion of using “ultra-dense hydrogen” for production of nuclear fusion. The application is not disclosed in a manner sufficiently clear and complete for it to be made and/or used by a person of ordinary skill in the art.

“Reproducibility” must go beyond one's own lab. One must produce a set of instructions (i.e., a recipe) that would enable anyone to produce the same results. It is the Examiners' position that an undue amount of experimentation would be required to produce an operative nuclear fusion embodiment of Applicant's invention. Also, even if the alleged nuclear fusion were somehow possible, it is unlikely to produce useful heat. For the many reasons discussed herein, Applicant’s disclosure is non enabling and inoperative, and would not enable the skilled artisan to make and/or use the recited invention.

This application claims an invention that contradicts known scientific principles. At best, Applicant has set forth what may be considered a concept or an object of scientific research. However, it has been held that such does not present a utility within the meaning of 35 U.S.C. 101. An invention that is "inoperative" (i.e., it does not operate to produce the results claimed by applicant) is not a "useful" invention in the meaning of patent law (MPEP 2107.01).

Additionally, it is also noted that while most of the work dealing with ultra-dense hydrogen is found to be published by the present inventor or a few additional scientists who are co-authors of the inventor in several publications (see for example the references mentioned in the application), no additional independent confirmation could be found for the actual provision of such ultra-dense hydrogen. Thus, the Examiner asserts that there is no credible, peer-reviewed published evidence to support the existence of the alleged “ultra-dense hydrogen”, especially for use in nuclear fusion.

The statute does not require independent verification or substantiation of a disclosure of an invention. However, enablement is determined based on whether one of ordinary skill in the art can make and use the invention, and an independent verification or substantiation of a disclosure of an invention is merely one non-limiting example of how an Applicant may meet the statute.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**5.** Claims 1-14 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility.

The reasons the invention as disclosed is deemed inoperative are the same as the reasons set forth in the above 35 USC § 112(a) rejection.

Applicant at best has set forth what may be considered a concept or an object of scientific research. However, it has been held that such does not present a utility within the meaning of 35 U.S.C. 101. See *Brennerv. Manson,* 148 U.S.P.Q. 689.

Additionally, it is well established that when, like here, the utility of the invention is based upon allegations that border on the incredible or allegations that would not be readily accepted by a substantial portion of the scientific community, sufficient substantiating evidence of operability must be submitted by Applicant. Note *In re Dash*, No. 04-1145, 2004 WL 2829039 (Fed. Cir. Dec. 10, 2004), and *In re Swartz*, No. 00-1108, 56 USPQ2d 1703. Also note *In re Houghton,* 167 U.S.P.Q. 687 (CCPA1970); *In re Ferens,* 163 U.S.P.Q. 609 (CCPA 1969); *Puharich* v. *Brenner,* 162 U.S.P.Q. 136 (CA DC 1969); *In re Pottier,* 152 U.S.P.Q. 407 (CCPA 1967); *In re Ruskin,* 148 U.S. P.Q. 221 (CCPA 1966); *In re Citron,* 139 U.S.P.Q. 516 (CCPA 1963); and *In re Novak,* 134 U.S.P.Q. 335 (CCPA 1962). One of ordinary skill in the art would doubt the operability of the invention.

***Objection to Specification***

**6.** The claimed invention as disclosed is deemed non enabling.

For the same reasons discussed above, the specification is objected to as being directed to an inoperable device.

## *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

**7.** Claims 1, 12, and 14, as best understood, are rejected under 35 U.S.C. 103 as being unpatentable over **Holmlid** ("Ultrahigh-density deuterium of Rydberg matter clusters for inertial confinement fusion targets", *Laser and Particle Beams* 27, no. 3 (2009): 529-532) in combination with **Soininen** (US 2015/0162104).

Holmlid discloses a hydrogen feature termed “ultra-dense hydrogen”. Accumulated dense hydrogen is targeted with a laser (i.e., a field source) for nuclear fusion. For example, note the title, abstract, and page 531.

Soininen shows that it is well known in the art to prepare hydrogen with a hydrogen transfer catalyst (e.g., styrene catalyst) prior to exposure to a laser beam to enhance nuclear fusion. The catalyst is between an inlet and an outlet. Note sections 0021, 0022, 0045, 0116, 0246. Like Soininen, Applicant [0066] uses a styrene catalyst.

Modification of Holmlid to have included a hydrogen transfer catalyst to enhance nuclear fusion, as suggested by Soininen, would have been obvious to one of ordinary skill in the art. Any positioning tilt would result in a sloping surface. According to Applicant’s reasoning, the laser in the modified Holmlid would inherently stimulate or induce emission of negative muons from hydrogen in the ultra-dense state.

### *Objection to the Abstract*

**8.** The abstract of the disclosure is objected to because it is unclear what constitutes "ultra-dense hydrogen" and "hydrogen in ultra-dense state". The abstract should include the technical disclosure of the improvement. Correction is required. See MPEP § 608.01(b).

### *Objection to the Title*

**9.** The Title is objected to because it is unclear what constitutes the "intended use". It is unclear whether the "intended use" implies that the Title should read "Apparatus for generating muons for a nuclear fusion reactor".

### *The Applied References*

**10.** For Applicant's benefit, portions of the applied reference(s) have been cited (as examples) to aid in the review of the rejection(s). While every attempt has been made to be thorough and consistent within the rejection, it is noted that the *prior art must be considered in its entirety* by Applicant, including any disclosures that may teach away from the claims. See MPEP 2141.02 (VI).

### *Application Status Information*

**11.** Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. For questions on access to the Private PAIR system, contact the Electronic Business Center at 866-217-9197 (toll-free). For assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (in USA or Canada) or 571-272-1000.

### *Interview Information*

**12.** Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, Applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

### *Contact Information*

**13.** Examiner Daniel Wasil can be reached at (571) 272-4654, on Monday-Thursday from 10:00-4:00 EST. Supervisor Jack Keith (SPE) can be reached at (571) 272-6878.

/DANIEL WASIL/
Examiner, Art Unit 3646
Reg. No. 45,303

/JACK W KEITH/
Supervisory Patent Examiner, Art Unit 3646

| Notice of References Cited | Application/Control No. 16/349,402 | Applicant(s)/Patent Under Reexamination HOLMLID, Leif | |
|---|---|---|---|
| | Examiner Daniel Wasil | Art Unit 3646 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | CPC Classification | US Classification |
|---|---|---|---|---|---|---|
| * | A | US-20150162104-A1 | 06-2015 | Soininen | G21B3/006 | 376/108 |
| | B | | | | | |
| | C | | | | | |
| | D | | | | | |
| | E | | | | | |
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**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | CPC Classification |
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | Holmlid, "Ultrahigh-density deuterium of Rydberg matter clusters for inertial confinement fusion targets", Laser and Particle Beams, 27, no. 3 (2009): 529-532. (Year: 2009) |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 16/349,402 | HOLMLID, Leif |
| | Examiner | Art Unit |
| | Daniel Wasil | 3646 |

| CPC - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
| G21B3/004; G21B3/008 | 02/19/2021 | DDW |

| CPC Combination Sets - Searched* | | |
|---|---|---|
| Symbol | Date | Examiner |
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| US Classification - Searched* | | | |
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| Class | Subclass | Date | Examiner |
| | | | |

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes | | |
|---|---|---|
| Search Notes | Date | Examiner |
| EAST database text search | 02/19/2021 | DDW |

| Interference Search | | | |
|---|---|---|---|
| US Class/CPC Symbol | US Subclass/CPC Group | Date | Examiner |
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| /DANIEL WASIL/<br>Examiner, Art Unit 3646 | |
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PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE


# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

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|---|---|
| Application Number | |
| Filing Date | |
| First Named Inventor | Leif HOLMLID |
| Art Unit | |
| Examiner Name | |
| Attorney Docket Number | 14003-000163/US/NPA |

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /DDW/

**U.S.PATENTS** Remove

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|---|---|---|---|---|---|---|
| | 1 | 20080008286 | A1 | 2008-01-10 | Jacobson | |
| | 2 | 20170022055 | A1 | 2017-01-26 | Kotzias | |
| | 3 | 20170025191 | A1 | 2017-01-26 | Kotzias | |

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|---|---|---|---|---|---|---|---|---|
| | 1 | 102015114749 | DE | A1 | 2016-09-22 | Airbus DS GmbH | | |

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| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 14003-000163/US/NPA |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2 | 2680271 | EP | A1 | 2014-01-01 | Holmlid | | |
| | 3 | 2016093324 | WO | A1 | 2016-06-16 | Univ Nihon | | |

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| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
|---|---|---|---|
| | 1 | ANDERSSON, P. et al., "Efficient source for the production of ultradense deuterium D(-1) for laser-induced fusion (ICF)," Review of Scientific Instruments, Vol. 82, 2011, 8 pages | |
| | 2 | BADIEI, S. et al., "Fusion reactions in high-density hydrogen: A fast route to small-scale fusion?" International Journal of Hydrogen Energy, Vol. 34(1), January 2009, pp. 487-495 | |
| | 3 | BADIEI, S. et al., "High-energy Coulomb explosions in ultra-dense deuterium: Time-of-flight-mass spectrometry with variable energy and flight length," International Journal of Mass Spectrometry, Vol. 282, Nos. 1-2, April 15, 2009, pp. 70-76 | |
| | 4 | HOLMLID, L. et al., "Charged particle energy spectra from laser-induced processes: Nuclear fusion in ultra-dense deuterium D(0)," International Journal of Hydrogen Energy, Vol. 41, 2016, pp.1080-1088 | |
| | 5 | HOLMLID, L. et al., "Muon detection studied by pulse-height energy analysis: Novel converter arrangements," Review of Scientific Instruments, Vol. 86, 2015, pp.083306-1 through 083306-8 | |
| | 6 | HOLMLID, L. et al., "Spontaneous ejection of high-energy particles from ultra-dense deuterium D(0)," International Journal of Hydrogen Energy, Vol. 40, 2015, pp. 10559-10567 | |
| | 7 | HOLMLID, L., "Leptons from decay of mesons in the laser-induced particle pulse from ultra-dense protium p(0)," International Journal of Modern Physics E, Vol. 25, No. 10, 2016, pp. 1650085-1 through 1650085-16 | |

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /DDW/

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| | Examiner Name | |
| | Attorney Docket Number | 14003-000163/US/NPA |

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|---|---|---|---|
| | 8 | HOLMLID, L., "Mesons from Laser-Induced Processes in Ultra-Dense Hydrogen H(0), " PLOS ONE \| DOI:10.1371/journal.pone.0169895, January 12, 2017, pp. 1-41 | |
| | 9 | HOLMLID, L., "MeV particles from laser-initiated processes in ultra-dense deuterium D(-1)," Eur. Phys. J. A, Vol. 48 (11), 2012, pp. 1-7 | |
| | 10 | HOLMLID, L., "MeV particles in a decay chain process from laser-induced processes in ultra-dense deuterium D(0)," International Journal of Modern Physics E, Vol. 24, No. 4, 2015, pp. 1550026-1 through 1550026-13 | |
| | 11 | HOLMLID, L., "Nuclear particle decay in a multi-MeV beam ejected by pulsed-laser impact on ultra-dense hydrogen H (0)," International Journal of Modern Physics E, Vol. 24, No. 11, 2015, pp. 1550080-1 through 1550080-18 | |
| | 12 | OLAFSSON, S. et al., "Rydberg phases of Hydrogen and low energy nuclear reactions," Abstract submitted for the April 16, 2016 Meeting of The American Physical Society, 1 page | |
| | 13 | PCT International Search Report and Written Opinion dated February 26, 2018 for International Application No. PCT/SE2017/051086, 12 pages | |

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**EXAMINER SIGNATURE**

| Examiner Signature | /DANIEL WASIL/ | Date Considered | 02/19/2021 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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|---|---|---|
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| | First Named Inventor | Leif HOLMLID |
| | Art Unit | |
| | Examiner Name | |
| | Attorney Docket Number | 14003-000163/US/NPA |

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

| Signature | /Michael A. Schaldenbrand/ | Date (YYYY-MM-DD) | 2019-05-13 |
|---|---|---|---|
| Name/Print | Michael A. Schaldenbrand | Registration Number | 47923 |

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

# Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S1 | 4 | ((("HOLMLID") near3 ("Leif"))).INV. | US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT | AND | ON | 2021/02/19 12:24 |
| S2 | 294 | (G21B3/004;G21B3/008).cpc. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 12:26 |
| S3 | 24 | "ultra dense" with hydrogen | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 12:27 |
| S4 | 8 | S2 and S3 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 12:27 |
| S5 | 16 | "ultra dense hydrogen" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 12:34 |
| S6 | 3 | ("20080008286" \| "20170022055" \| "20170025191").PN. | US-PGPUB; USPAT | AND | ON | 2021/02/19 12:45 |
| S7 | 1,663 | muon | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 12:48 |
| S8 | 6 | S4 and S7 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 12:49 |
| S9 | 31,363 | styrene with catalyst | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 14:40 |
| S10 | 1 | S9 and muon | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 14:42 |
| S11 | 1,103 | S9 and fusion | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 14:42 |
| S12 | 26,704 | nuclear with fusion | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 14:42 |
| S13 | 10 | S9 and S12 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 14:43 |

| | | | | | | |
|---|---|---|---|---|---|---|
| S14 | 2 | laser and S13 | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO | AND | ON | 2021/02/19 14:51 |

2/19/2021 3:52:01 PM
C:\Users\dwasil\Documents\EAST\Workspaces\16\16-349402.wsp

# Bibliographic Data

Application No: 16/349,402

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [ ] Met After Allowance

Verified and Acknowledged: /DANIEL WASIL/ Examiner's Signature | Initials

Title: APPARATUS FOR GENERATING MUONS WITH INTENDED USE IN A FUSION REACTOR

| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|
| 05/13/2019 | 376 | 3646 | 14003-000163/US/NPA |
| RULE | | | |

**APPLICANTS**

NORRONT FUSION ENERGY AS, SLEMMESTAD, NORWAY

**INVENTORS**

Leif HOLMLID, MÖLNLYCKE, SWEDEN

**CONTINUING DATA**

This application is a 371 of PCT/SE2017/051086 11/02/2017

**FOREIGN APPLICATIONS**

SWEDEN SE1651504-1 11/17/2016

**IF REQUIRED, FOREIGN LICENSE GRANTED****

08/27/2019

**** SMALL ENTITY ****

**STATE OR COUNTRY**

SWEDEN

**ADDRESS**

RMCK Law Group, PLC
PO Box 210280
Auburn Hills, MI 48321
UNITED STATES

**FILING FEE RECEIVED**

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