IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No.	:	13/512,065	Applicant	:	Arash Mofakhami
Filed	:	October 22, 2012	Conf. No.	:	3305
Title	:	METHOD FOR GENERATING NEUTRONS			
Examiner	:	Sean P. Burke	Art Unit	:	3646
Docket No.	:	N&P-49601	Cust. No.	:	86378

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF GUILLAUME HUBERT UNDER 37 C.F.R. § 1.132

I, Guillaume Hubert, do hereby declare and state:

1. I am a citizen of France and have worked in the field of radiation field characterizations and radiation effects for over 16 years.

2. My educational background is as follows master degree (1998), Ph. D (2001) and capacitation to supervise PhDs (HDR degree in France, 2011).

3. I am a researcher who works for the French Aerospace Lab (ONERA) as a Senior research scientist.

4. I am the author or co-author of over 60 scientific and technical papers and have co-authored and/or presented over 60 scientific abstracts at scientific meetings. Please refer to the copy of my curriculum vitae attached herewith for more details.

5. I have reviewed the Office Action dated August 19, 2015 ("Office Action") for the above-referenced patent application as well as the patent application and claims pending in the patent application.

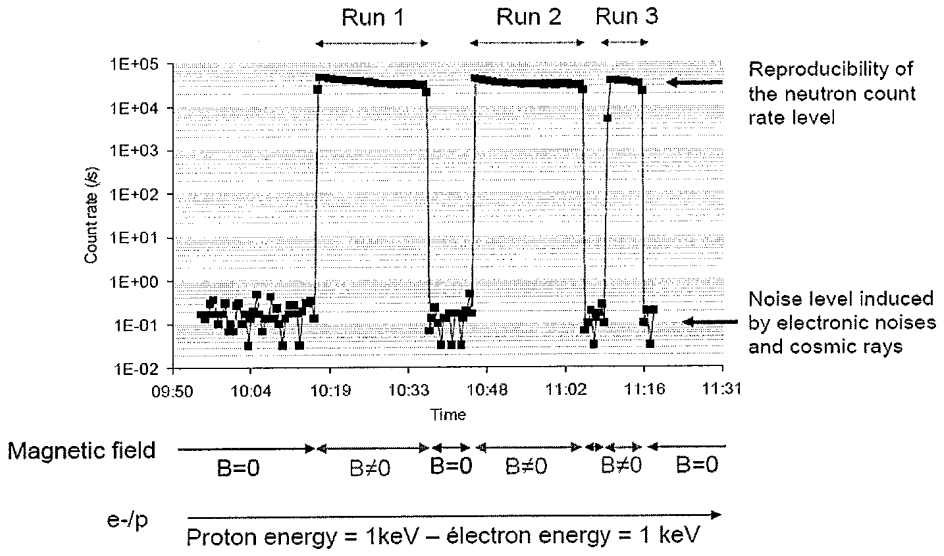
6. I understand the claimed invention is rejected on the grounds of being not supported by either an operable asserted utility or a well-established utility. Specifically, the Examiner states that he is unaware of any peer-reviewed source to indicate that colliding spin-polarized electron and proton beams would produce neutrons.

7. After conducting an experiment at ONERA's facilities, I observe with a neutron spectrometer that high count rate are induced by colliding protons and electrons at very low energy after having their magnetic momentums (or spins) aligned by a gradient of magnetic fields and/or with appropriated radiofrequencies. The equipment used and the experiment conducted will be described below.

8. A high energy range multisphere extended system (HERMEIS) was used to calculate neutron fluence energy distribution. HERMEIS is a spectrometry system for neutron energies from 10^{-9} MeV to 10 GeV. The system contains 13 Bonner spheres, including three extended ones with tungsten and lead shells and 10 homogeneous polyethylene $(C_2H_4)^n$ spheres with increasing diameters (3, 3.5, 4, 4.5, 5, 6, 7, 8, 10, and 12 inches, respectively). The three extended spheres are three counters surrounded by polyethylene and a shell made of a high Z material to increase the response at high energy that to (n,xn') reactions. The metals chosen are tungsten (Z=74) and lead (Z=82). The three extended spheres are 7 and 8 inches with tungsten shells and 9 inches with a lead shell. A ^{3}He spherical proportional counter with a diameter of 2 inches and filled with a pressure of 10 atm is placed at the center of the spheres. The detecting reaction, ^{3}He(n,p)T has a cross section for thermal neutrons of 5321 barns, resulting in a high detection sensitivity. The events occurring in the sensitive volume of the detector are recorded via a Multi-Channel Analyser after amplification. This pulse height spectrum is intergrated from a threshold to discrimate the electronics/gamma noise and to give the gross neutron counts for each sphere.

9. A demonstrator system was designed in accordance with claim 1 of the present patent application. The demonstrator system was composed from proton and electron sources providing electron and proton beams which are collided under the central axis of two magnetic coils. A magnetic field was utilized in order to align the spins (magnetic momentums) of the electrons and protons. All of the protons forming the proton beam and all of the electrons forming the electron beam had an energy less than or equal to 1 KeV. The proton and electron beams are generated under $4 \cdot 10^{-3}$ mbar. The HERMEIS neutron sensor was placed under the proton beam axis 15 cm from the exit channel of the demonstrator system.

10. In order to ensure that neutrons were not detected without the application of the magnetic fields, the magnetic field was turned on for 20 minutes, turned off for 10 minutes, turned on for 20 minutes, turned off for 4 minutes, and turned on for 5 minutes. The results appear below. The quiet count level measured when the system was off (electron beam was on, proton beam was on, and magnetic field was off) can be correlated by the electronic noise and the cosmic rays. When the system was activated (electron beam was on, proton beam was on, and magnetic field was on), the count rate level increases significantly.



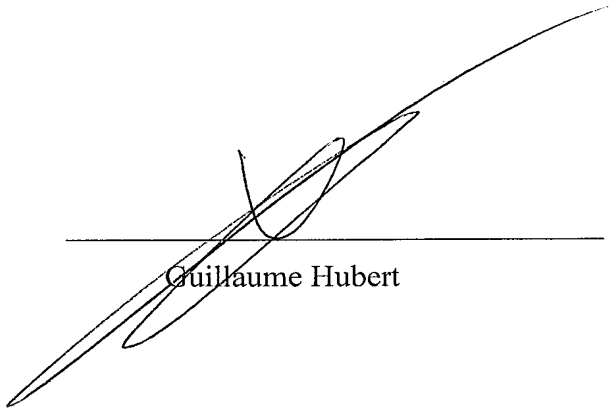
11. Measurements were performed using the 3, 3.5, and 4 inch Bonner spheres and the bare ^{3}He detector. High count rate levels were observed for each detector configuration, except for the bare ^{3}He detector. This differentiation suggests that the origin of the count rate increase does not appear to be due to a parasitic or noise source.

12. I further state that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced patent application or any patent issuing thereon.

6-14

February, 15, 2016

Date



Guillaume Hubert