# Distance dependency of spontaneous decay signal from ultra dense hydrogen source

#Sindre Zeiner-Gundersen [1], S. Olafsson [2]
[1] University Of Iceland, Iceland

Email: sindrezg@gmail.com

Ultra dense hydrogen has been reported to emit spontaneous high-energy particles, Kaons, Pions and Muons [1][2][3][4]. Kaon decays to Pions with a lifetime of $(1.2380\pm0.0021)\times10^{-8}$ s and Pions decay to Muons with a lifetime of $2.6033\times10^{-8}$ seconds. Some of Leif Holmlids work has been replicated in Oslo using his advice and similar setup. The aim of this work is to study the distance dependency of the spontaneous signals from a ultra dense hydrogen source.

There are no published reports by Leif Holmlid were the distance behavior of the signal from an ultra dense hydrogen source has been studied in detail at longer distances. A custom-built experimental setup was assembled with two different multichannel analyzers attached to the same photoelectron multiplier fitted with muon converter [1] [5]; here we report measurements from different distances to an ultra dense hydrogen source.

Figure 1: Movable detection equipment to measure spontaneous signal from a ultra dense hydrogen source.

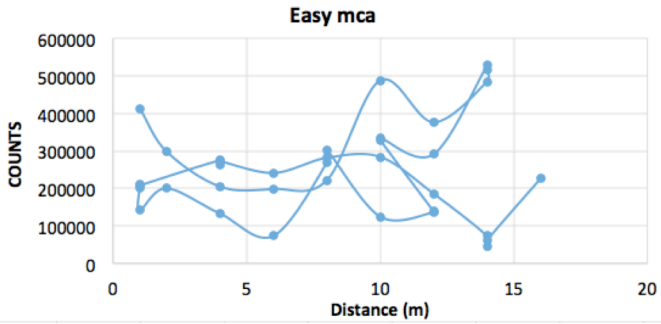


Figure 2: Distance dependency of spontaneous decay signal from an ultra dense hydrogen source. First showing a decrease in counts from 0-8 m then a increase in counts from 8 to 15 m. When moving the detector closer to source we can see the same behaviour. Some fluctuations does occur possible due to time variations from first measurements.

[1] Holmlid, L., & Olafsson, S. (2015). Muon detection studied by pulse-height energy analysis: Novel converter arrangements. *Review of Scientific Instruments*, *86*(8). https://doi.org/10.1063/1.4928109

[2] Holmlid, L., & Olafsson, S. (2016). Charged particle energy spectra from laser-induced processes: Nuclear fusion in ultra-dense deuterium D(0). *International Journal of Hydrogen Energy*, *41*(2), 1080–1088. https://doi.org/10.1016/j.ijhydene.2015.10.072

[3] Holmlid, L., Olafsson, S., & Science, A. (n.d.). Detection of muons and neutral kaons from ultra-dense hydrogen H ( 0 ) by lepton pair-production, (0), 1–34.

[4] Holmlid, L. (2018). Neutrons from Muon-Catalyzed Fusion and Muon-Capture Processes in an Ultradense Hydrogen H(0) Generator. *Fusion Science and Technology*, *1055*(0), 1–10.

[5] Tamamushi, S. (2014). Lifetime of Positive and Negative Muons in Matter. Retrieved from http://www.nucl.phys.titech.ac.jp/presen/data/thesis/b/ay2014/tamamushi/thesis/main.pdf