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**Rydberg phases of Hydrogen and low energy nuclear reactions**

SVEINN OLAFSSON, Faculty of Physical Sciences, University of Iceland, Reykjavik, Iceland, LEIF HOLMLID, Atmospheric Science, Department of Chemistry and Molecular Biology, University of Gothenburg, SE-412 96 Goteborg, Sweden — For over the last 26 years the science of cold fusion/LENR has been researched around the world with slow pace of progress. Modest quantity of excess heat and signatures of nuclear transmutation and helium production have been confirmed in experiments and theoretical work has only resulted in a large flora of inadequate theoretical scenarios. Here we review current state of research in Rydberg matter of Hydrogen that is showing strong signature of nuclear processes. In the presentation experimental behavior of Rydberg matter of hydrogen is described. An extensive collaboration effort of surface physics, catalysis, atomic physics, solid state physics, nuclear physics and quantum information is need to tackle the surprising experimental results that have so far been obtained. Rydberg matter of Hydrogen is the only known state of matter that is able to bring huge collection of protons to so short distances and for so long time that tunneling becomes a reasonable process for making low energy nuclear reactions. Nuclear quantum entanglement can also become realistic process at theses conditions.

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