Contribution ID: **136** Type: **Oral**

Downhole generator based on a line pulse transformer for electro pulse drilling.

Tuesday 20 June 2017 13:30 (1h 30m)

Ever-increasing energy demands require new energy sources. Modern oil extraction industry is targeted at extracting oil products at larger depths [1]. Some European countries, for example, Switzerland, Germany, develop technologies for geothermal energy harvesting from the natural heat of the Earth [2]. Accomplishing these goals needs new scientific approach to deep and ultra-deep drilling. One of the most efficient methods of ultra-deep drilling is electro pulse disintegration of rocks [3], which is based on the effect of discharge channel penetration into a solid (discovered in Tomsk, Russia [4–6]). Clearly, the energy transfer to the bottom of a well from a high-voltage pulse generator located on the surface decreases the drilling efficiency. For enhancing the efficiency, the generator should be located in the immediate proximity to the drill head, i.e., it should be downhole. Here we consider the possibility of designing and using a downhole generator based on a line pulse transformer (LPT generator) for electro pulse drilling of rocks. Preliminary laboratory tests on different rock samples demonstrate that the LPT generator provides a 30 % higher specific output compared to Marx generators conventionally used in the technology. The LPT generator design is rather simple and admits a smaller number of switches, which increases its reliability and lifetime. It is also possible to realize an LPT circuit with a pulse current generator (LPT-PCG circuit) to further enhance the discharge energy and the generator efficiency compared to Marx generators.

Author: Mr DENIS, Molchanov (IHCE SB RAS)

Co-authors: Mr LAVRINOVICH, Ivan (HCEI SB RAS); Prof. LAVRINOVICH, Valeriy (National Research Tomsk Polytechnic University); Dr RATAKHIN, Nikolay (IHCE SB RAS); Dr VAZHOV, Vladislav (National Research Tomsk Polytechnic University)

Presenter: Mr DENIS, Molchanov (IHCE SB RAS)

Session Classification: Poster session II - Pulsed Power Industrial and Bio-Medical Applications

Track Classification: Pulsed Power Industrial and Bio-Medical Applications