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HIGH PULSED POWER AT CEA DAM

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High Pulsed Power (HPP) system have been developed at CEA-DAM in France for the last 6 decades in order to assist with National Defence and Deterrence programmes in which they play a key role. HPP technologies are generally used as key subsystems of a more complex equipment such as large accelerators or laser facilities. This talk aims at giving an overview with an historical perspective on the HPP technologies that are currently operational or being developed at CEA-DAM. The main achievements in different fields of applications are reported according to a technology orientated approach.

First this talk briefly presents the main features of the pulse power systems for the Laser MegaJoule (LMJ). Then, the talk covers the contribution of HPP to the Lab-scale simulation of extreme environments (radiative and non-radiative). It presents the specifications, technologies and performances of HPP facilities developed at CEA in order to carry out a wide variety of experimental studies to assess the resistance of engineered systems to severe environment.

Pulsed power activities at CEA-DAM related to High-Power Microwave (HPM) systems for defence electromagnetic applications are also presented. A brief focus is given on a recent development of a compact and repetitive Marx generator.

As the HPP expertise at CEA-DAM is also oriented towards enabling technologies and non-military applications in order to address key issues in various fields ranging from fundamental research to industry, few examples of recent achievements are shown to illustrate the potential of HPP for scientific and industrial applications.

Eventually, this talk presents the latest HPP development on flash X-ray radiography. The Teutates collaboration between the United Kingdom and France is introduced and the experimental facilities, EPURE in France and the Technology Development Centre (TDC) in the UK are presented through their main pulse power equipment that are the 20MeV Linear Induction Accelerator in operation as a 1st axis in EPURE and the 7.5MeV Inductive Voltage Adder currently commissioned in the TDC prior to being used as a 2nd axis in EPURE. The HPP work for the 3rd radiographic axis of the EPURE facility are highlighted as well.

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