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High Power Microwaves facilities and generators of CEA/GRAMAT

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During the last two decades, HPM (High Power Microwaves) effects on systems such as electronic devices and sometimes biological samples have been studied in CEA/Gramat. These studies led to actual designs of several HPM generators, each corresponding to a specific technology or experimental area. This paper presents two high-sized electromagnetic simulators named Hyperion and MELUSINE.
The "Hyperion"facility is a building comprised of a large testing area (18x18x18 m) and a RF power generation room. It uses two large reflectors to radiate a plane wave in that testing area. Targets are positioned on a 50-ton swing bridge, allowing testing on heavy objects. A wide variety of sources is available to generate field levels between 10 kV/m and 1 MV/m. As an example, several relativistic magnetrons were associated with a Tesla generator, providing electromagnetic power up to several hundreds of MW in L band.
MELUSINE is a 100 m long, 6 m radius half-cylinder semi-anechoic tunnel. This facility is used for the study of 100 MW to 1 GW class HPM relativistic generators above 1 GHz. As an example, the ultra-compact generator CLAIRE has been deployed and used in Melusine. CLAIRE is low-volume (0.3 m3) source capable of producing powers up to several hundreds of MW in X band.
Classic and specific metrology equipment is deployed in these electromagnetic simulators, such as field sensors, infrared thin film EMIR, power couplers. Also, specific measurement technique such as calibration or new optoelectronic field measurement methods is presented.

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