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Massive simulation of complex electromagnetic cavities[1] FRANCO MOGLIE, LUCA BASTIANELLI, VALTER MARIANI PRIMIANI, Universita' Politecnica delle Marche - DII, Ancona — The analysis of the chaotic behavior of complex electromagnetic cavities takes benefit from the availability of a large amount of data on field samples. The application of a code running on a supercomputer is able to return a precise electromagnetic simulation of electrically large structures. The simulations of mode-stirred reverberation chamber (RC) were performed using an in-house parallel finite-difference time-domain (FDTD) code. The code is divided into three modules that are managed by a unique, single-step job: the electromagnetic solver based on the FDTD method; a fast Fourier transform (FFT) to obtain the frequency domain behavior; a statistical tool to obtain the RC properties. A unique run produces statistical results for all the investigated stirrer angles, without the burden of saving intermediate data. The code implements a hybrid parallelization as function of stirrer angle and cavity volume. Specifically, such a computation is known to be "embarrassingly parallel" with respect to the stirrer angle. The excitation is a Gaussian pulse modulated sinusoid at 1.1 GHz: the 95% bandwidth is 0.2 and 2 GHz. After the FDTD simulation is completed, the FFT module gives the frequency behavior of the fields in each point with a resolution of about 50 kHz.

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