

# Electromagnetics



## Susceptibility levels

- System
- Equipment
- Electronic components

## Design/specification

- EM shielding
- X-ray shielding
- Filters, protection devices

## Recommendations

- Cable routing design rules
- Grounding & bounding

## Applied Mathematics

- Maxwell-Vlasov-Boltzmann equations
- Magnetohydrodynamics

## Software development

- 3D EM solvers (FDTD-PIC, DGTD-PIC)
- EM Software suites
- Parallelization (MPI, OpenMP)

## Design/development of test facilities

- Local Injection Horn Antenna
- Wave generators

## Engineering & Hardening solutions

## Tests & measurements

### Pulsed or continuous wave tests

- HEMP (Sub-system level NEMP simulator)
- HPM (magnetron, UWB generator)
- Immunity and EM shielding effectiveness measurements (reverberation chamber)
- SGEMP (Flash X-ray generator)

### Pulsed current injection tests

- Transfer impedance measurements
- Cable harness
- EMP, lightning, HIRF, SGEMP

## Modelling & computation

### EM levels

- Mission analysis

### Electric transients on a system down to the pin level

- EMP/IEMI, HPM
- Lightning (indirect effects)
- SGEMP

### Plasma

- SGEMP
- Laser

## R&T

## Physics

### Plasma physics

- Radiation-induced environment ionization
- Laser-matter interactions

### Electromagnetics

- Wave generation
- Propagation in vacuum and in ionized environment
- Coupling to systems