If you wish to use a **SPARK3D** trial version for a 6 week period, please contact us:

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# SPARK 3D

## Powering your designs

**SPARK3D** is a unique simulation tool capable to determine the Breakdown power level in a wide variety of passive devices. By importing the Electromagnetic field from some of the most well-known EM commercial solvers, **SPARK3D** is able to analyse vacuum breakdown (multipactor) and gas discharge. As outcome, the maximum power that the device can handle without developing a discharge is provided.

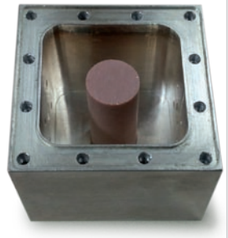
Thanks to its coupling to commercial tools, it is highly flexible and versatile allowing the analysis of any type of components based on a wide range of technologies such as cavities, waveguides, microstrip, antenna, etc. Moreover SPARK3D can be easily extended to be used by other software tools.

**SPARK3D** is a module of **FEST3D** (www.fest3d.com) that can be also acquired as an stand-alone program.

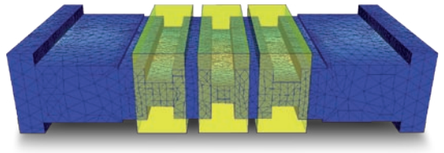
BY AURORASAT™

# SPARK 3D

Powering your designs



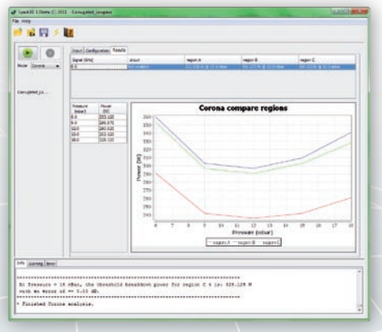
Photograph of the prototype



## Features

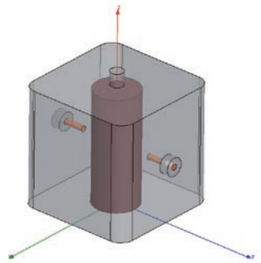
**SPARK3D** has several features in order to better analyse high power effects in devices:

- Imports ANSYS® HFSS™ EM fields to perform high power simulations.
- Imports CST Microwave Studio® to perform high power simulations.
- Imported EM fields can be visualized.
- Analysis boxes can be defined in order to choose the critical regions to be analysed.
- CAD-like and intuitive graphical interface to the user. The user can easily import the EM field, launch the 3D CAD viewer, run different type of simulations, etc.
- Real-time output interface with rich simulation data, in table, plot and 3D view forms, for each particular region.
- Compare regions feature allows for easily visualizing the results of all analysis regions at a time.

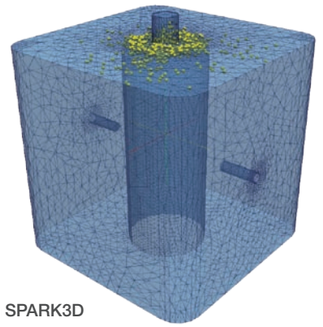




## Unique tool

- High power prediction simulations can be performed in a wide range of components based on different technologies.
- It is possible to compare the breakdown onset obtained using EM fields calculated from different EM simulators.
- In complex devices, the simulation can be performed in the zones defined by the user, speeding up the simulation.



ANSYS® HFSS™ model



Electron distribution after breakdown calculated with **SPARK3D**

## Multipactor

**SPARK3D** performs multipactor simulations on the designs imported from EM commercial solvers.

The specific features for Multipactor calculation include:

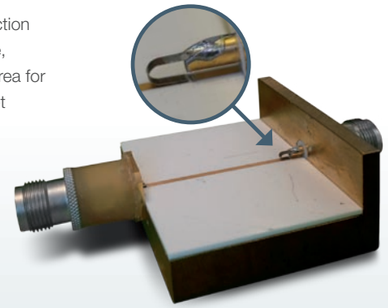
- Electron tracker
- Automatic breakdown onset search
- Custom SEY curve import
- Optional external DC magnetic field

### Example

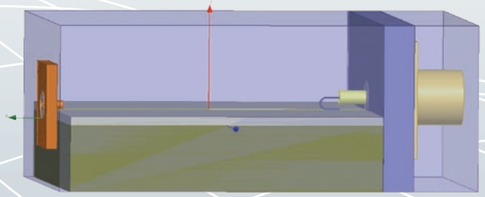
Dielectric-loaded cavity resonator at 2.335 GHz (courtesy of Thales Alenia Space España).

The breakdown onset is calculated using **SPARK3D** combined with ANSYS® HFSS™ EM fields.

| Multipactor breakdown onset computed with SPARK3D | |
|---|---|
| Simulated breakdown power/mW | **470** |
| Measured Breakdown power/mW | **380 - 470** |



The TNC connection with the strip line, is the potential area for breakdown onset



ANSYS® HFSS™ model and **SPARK3D** visualization of the EM field imported from HFSS™

## Gas discharge

**SPARK3D** computes the Gas discharge (Corona) breakdown for the structures imported from external EM-solvers.

The specific features for Gas discharge calculation include:

- Automatic breakdown onset
- Representation of Paschen curves
- Modelling with different filling gases
- Breakdown calculation at ambient pressure

### Example

Microstrip line connected to a TNC pin with a metallic ribbon and a SMA connector touching the strip.

The breakdown onset is calculated at 1.5 GHz using **SPARK3D** combined with ANSYS® HFSS™ EM fields.

| Gas (air) discharge breakdown onset @ 3 mBar computed with SPARK3D | |
|---|---|
| Simulated breakdown power/mW | **107** |
| Measured Breakdown power/mW | **63 - 125** |