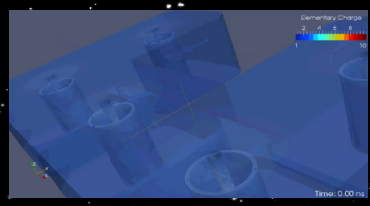


NUWAVES ENGINEERING

PRESENTS

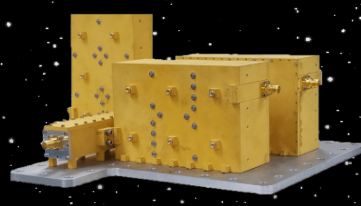
MULTIPLICATION FILTER DESIGN AND SIMULATION FOR SPACEBORNE APPLICATIONS

Multipaction, or the multipactor effect, is a phenomenon of resonance between electron trajectory and EM fields, normally between two plates (surfaces), which causes exponential electron multiplication resulting in an electron avalanche (plasma). This can result in an increase of reflection, harmonics, temperature, outgassing, etc., as well as permanent damage to the RF device.



Industry Leading Software

Simulated multipaction event visualized using particle tracking techniques

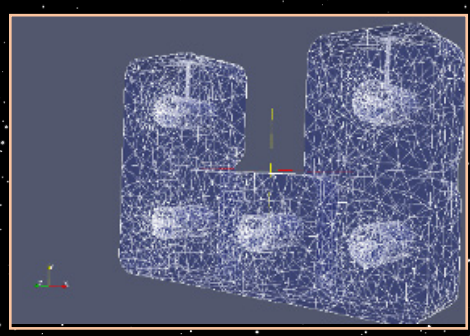


Sample of Work

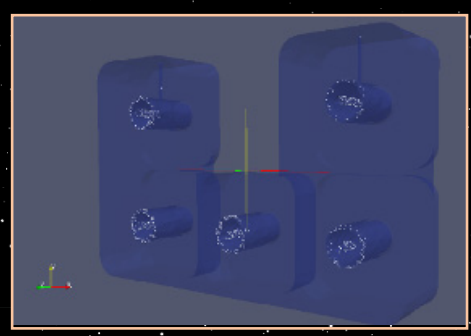
Technologically Advanced N-plexer for GPS III Operation (TANGO) Phase II SBIR

NuWaves Engineering offers **unparalleled multipaction filter design and simulation services** using industry-leading software tools including CST Microwave Studio and Spark3D.

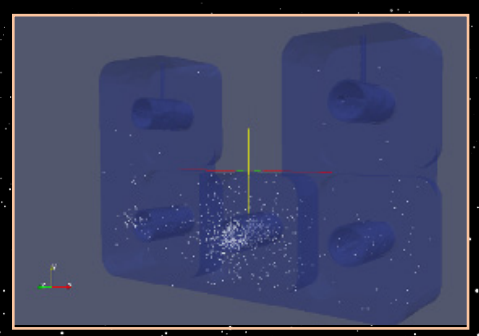
Industry Leading Software: Multipaction Particle Tracking



Adaptive tetrahedral mesh used to solve E- and H-field strength, providing superior accuracy on small features or features that are cylindrical.



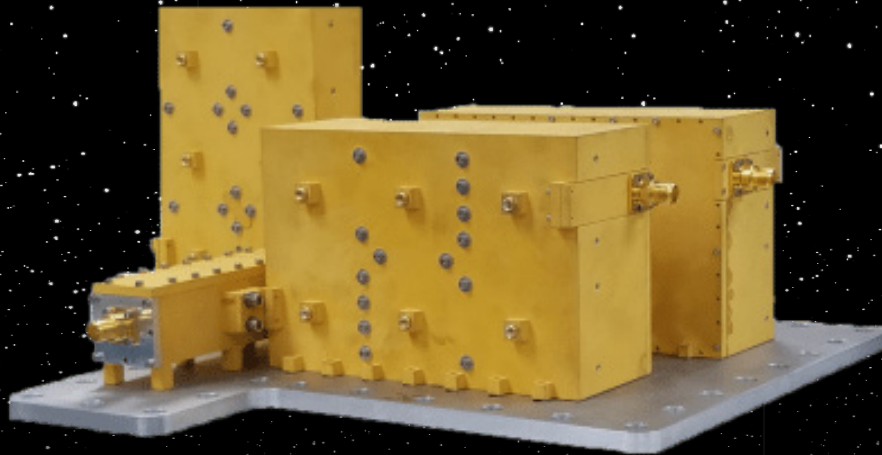
Electrons seeded in high field strength areas, allowing numerical solver tracking capability to measure trajectory and charge when electrons are acted upon by the E- and H-fields.



Avalanche of electrons indicating secondary electron emission in area of breakdown. This is counter to normal operation, where electrons decay at a predictable rate over time.

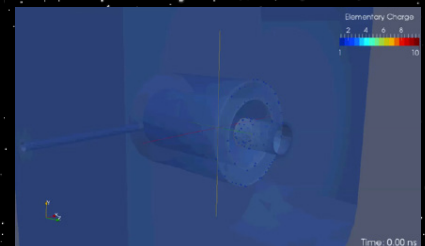
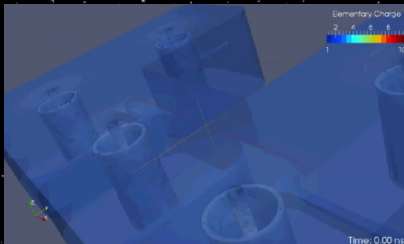
SAMPLE OF WORK:

GPS III TRI-BAND MULTIPLEXER FOR MULTIPACTION PERFORMANCE



NuWaves' unique tri-band multiplexer design **successfully completed multipaction testing exceeding 800 watts at each band, while achieving insertion loss of less than 0.5 dB for each band.** This high performance tri-band multiplexer design serves the Air Force Research Laboratory's (AFRL) Technologically Advanced N-plexer for GPS III Operation (TANGO), raising the bar for space-qualified components by creating best-in-class multipaction performance.

SEE IT IN ACTION!



A veteran-owned small business (VOSB) founded in 2000, NuWaves Engineering is a premier supplier of Radio Frequency (RF) and Microwave Solutions for military, government, industrial, and commercial customers. NuWaves provides quick-tempo design and engineering services that address the most demanding customer requirements, especially with regard to hardware size, weight and power (SWaP) reduction, cost and – often times equally important – schedule. NuWaves also offers a broad catalog of high performance commercial off-the-shelf (COTS) RF products, many of which have been derived from custom developments.