

Modeling of RF Vacuum Devices

Dr. Simon Cooke

Computational modeling has become an indispensable tool that supports the research, design, and optimization of vacuum electronic devices, and thereby reduces reliance on costly fabrication and testing iterations. 3D simulation tools have become highly accurate and more accessible due to advances in both simulation algorithms and computer hardware performance. At the same time, many classes of vacuum device are well suited to using reduced dimensionality models, which take advantage of well-validated approximations to create 2D or 1D “large-signal” simulation codes that can be substantially faster, yet still provide highly accurate predictions of device performance.

This lecture will cover some of the underlying physics theory, models and numerical methods (in both frequency- and time-domain) that are used to create modern simulation tools and will discuss how they may be applied effectively to modeling of RF vacuum devices.