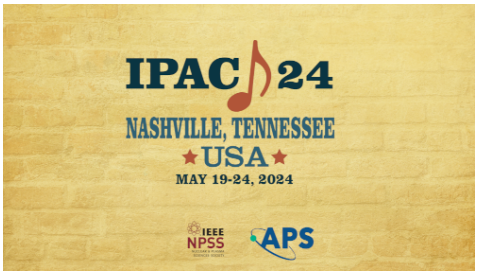

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Modeling of single-beam and multiple-beam klystrons by the TESLA-family of large-signal codes

Tuesday, 21 May 2024 16:00 (2 hours)

Klystrons and Multiple-Beam Klystrons (MBKs) are widely used or proposed to be used in accelerators as high-power RF sources. Development and optimization of klystron and MBK's designs is aided by the use of different simulation tools, including highly efficient large-signal codes. We present an overview of capabilities of the TESLA-family of 2.5D large-signal codes, which have been developed at the Naval Research Laboratory (NRL) and which are suitable for the accurate modeling of single-beam and multiple beam klystrons. TESLA algorithm does support proper treatment of 'slow'and 'reflected'particles, what enables accurate modeling of high-efficiency klystrons. Recently developed more general TESLA-Z algorithm is based on the impedance matrix approach and enabled accurate, geometry-driven large-signal modeling of devices with such challenging elements as multiple-gap cavities, filter-loading, couplers and windows. Finally, recent introduction of the reduced-order, 1.5D versions of the TESLA algorithms enabled much faster, but limited modeling options. Examples of applications of TESLA-family of codes to the modeling of advanced single-beam and MBKs will be presented.

Footnotes

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