

## Synthesis modules

FEST3D Synthesis modules implement automatic component design through an easy-to-use interface

**FEST3D** Synthesis modules perform automatic design of several types of components from user specifications: bandpass filters, lowpass filters, rectangular tapers, and dual-mode filters. These modules employ state-of-the-art synthesis methods which do not generally need post-optimization to match the user requirements.

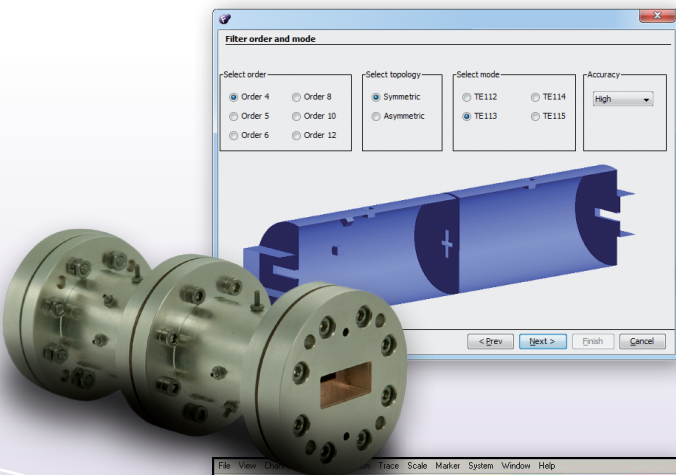
The user can easily set all the electrical and geometrical specifications through a very intuitive graphical user interface. These software modules automatically determine the physical dimensions of the structure once the specifications have been given.

### Dual-Mode Filters

This module allows designing automatically Dual-Mode Filters. The filter structure is composed of circular cavities connected between them through rectangular or cross irises. Additionally, coupling and tuning screws are placed inside each cavity.

This synthesis tool is capable of designing 4, 5, 6, 8, 10, 12-pole filters for the TE112, TE113, TE114 and TE115 modes.

The circular cavities are connected between them through rectangular or cross irises, which may have rounded corners. Input/output off-centered irises with respect to the circular cavities can be used.



**DMF filters synthesis time: core2duo@2.0GHz**

Filter synthesized	Computation time
Order 4	8 minutes
Order 8	15 minutes
Order 12	35 minutes

FEST3D Synthesis modules do not generally need post-optimization to match the requirements

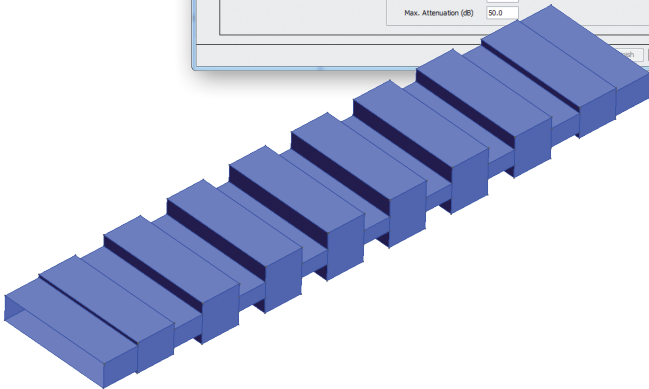
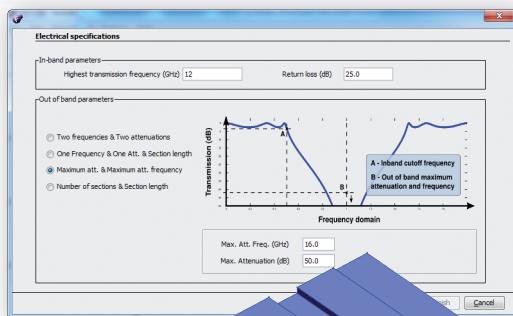
## Lowpass Filters and Impedance Transformers

The Lowpass Filter and Impedance Transformer Synthesis modules provide advanced automatic design of rectangular and coaxial waveguide Chebyshev response lowpass filters and multi-section impedance transformers.

FEST3D can synthesize the following list of devices:

- Rectangular symmetric/asymmetric corrugated lowpass filters and impedance transformers with squared corners.
- Rectangular symmetric lowpass filters and impedance transformers with rounded corners.
- Rectangular symmetric and asymmetric iris-coupled lowpass filters with squared corners.
- Coaxial lowpass filters and impedance transformers.

These modules allow setting in-band and out-band electrical specifications for the lowpass filters, including the possibility of automatically adding transformers at the input/output ports to match the impedance required by the user.



## Bandpass Filters

The waveguide Bandpass Filter Synthesis Tool is an instrument to design waveguide Chebyshev bandpass filters. This module is able to design narrow and very **wide-band (20-25%)** bandpass filters generally without post-optimization.

This synthesis tool is capable to synthesize the following homogeneous and in-homogeneous filters:

- Inductive iris coupled filters with or without rounded corners
- Metal insert filters
- Inductive post filters

The user can easily set the electrical in- and out-band specifications as well as the filter order through the graphical interface.

