

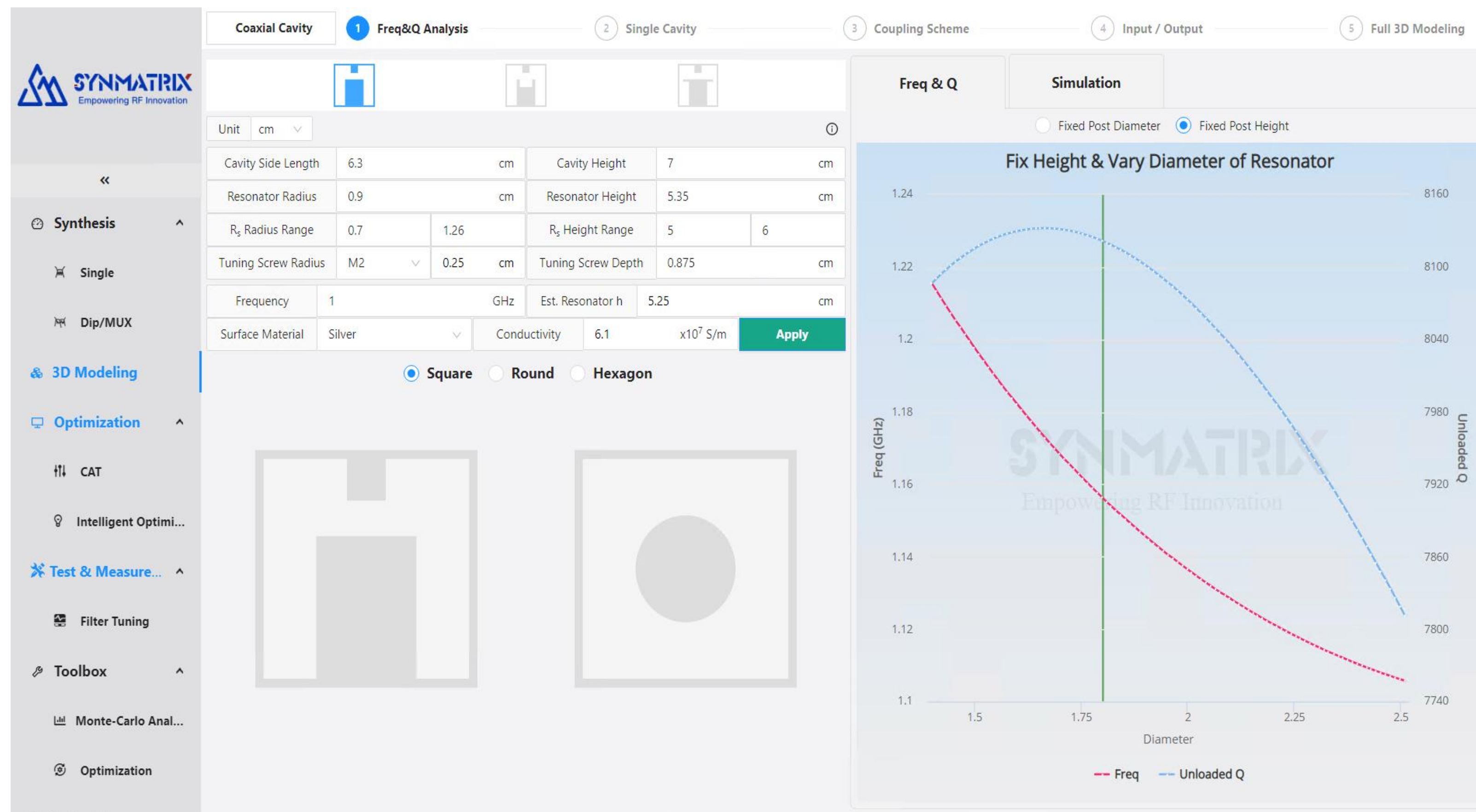


# 3D Modeling Function Introduction



# 3D Modeling Function Introduction

The new 3D modelling function is a design workflow based automatic modelling function. It includes the single resonator modelling and analysis, coupling schemes(adjacent coupling and input/output coupling) modelling and analysis and customized full 3D modeling function;



# 3D Modeling Function Overview

## Filter Type Selection

Support different filter application:

- Coaxial cavity;
- Rectangular waveguide(Coming soon);
- Cylinder waveguide(Coming soon);

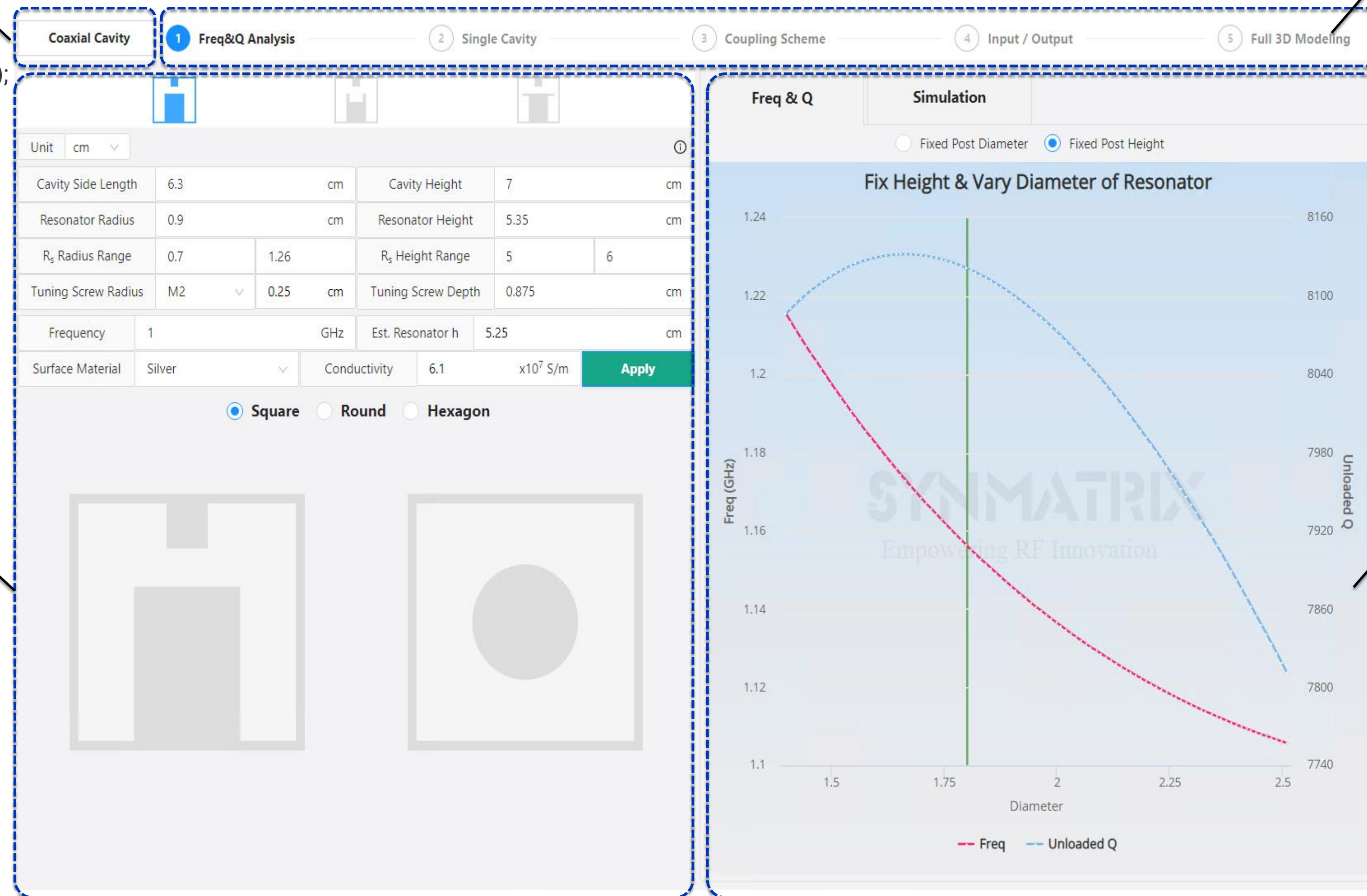
## Design Workflow Selection

Standard design workflow

- Single cavity modelling & Simulation;
- Adjacent coupling modelling & Simulation;
- Input/output coupling schemes;
- Customized full 3D modelling;

## Resonator Analysis & Synthesis

- Support different shapes resonator,
- Frequency & Unloaded Q analysis;
- Mode chart analysis;
- Dimension synthesis;



## Analysis & Simulation Plot

Analysis and simulation results plotting:

- Sync up with HFSS result;
- Parametric study curve;
- Curve fitting—regression analysis
- Frequency, unloaded Q, coupling coefficient, group delay

# 3D Modeling Function—Single Resonator Analysis

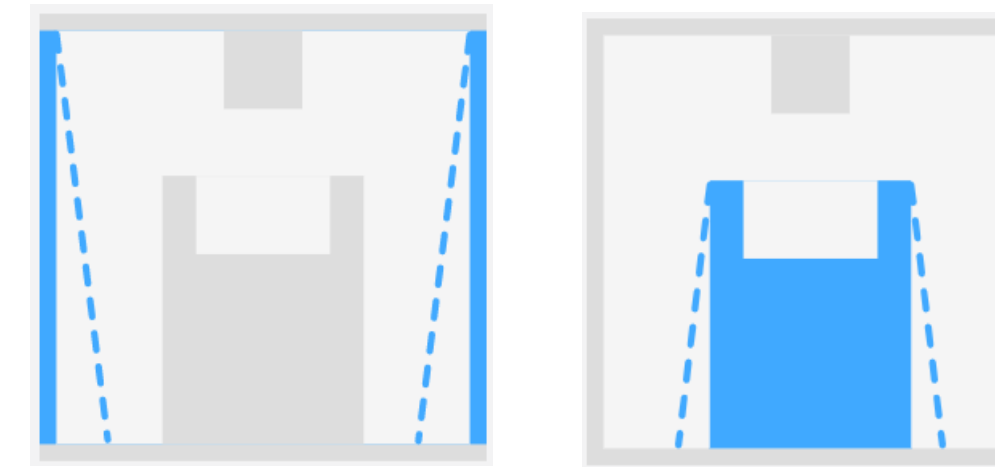


**1 Cavity Design** > **2 Tuning Schemes** > **3 Simulation**

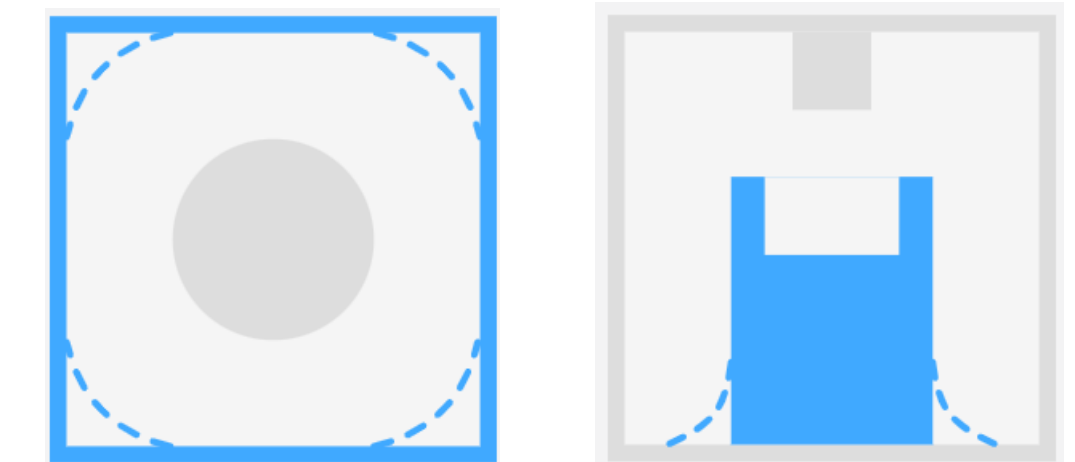
Cavity Width	6.3	cm	Cavity Length	6.3	cm
Cavity Height	7	cm			
ⓘ Draft Angle - Housing	1	deg	ⓘ Draft Angle - Resonator	1	deg
ⓘ Rounding - Housing	0.25	cm	ⓘ Rounding - Resonator	0.3	cm
Surface Material	Silver		Conductivity	6.1	$\times 10^7$ S/r

## Customize design:

✓ Draft angle:



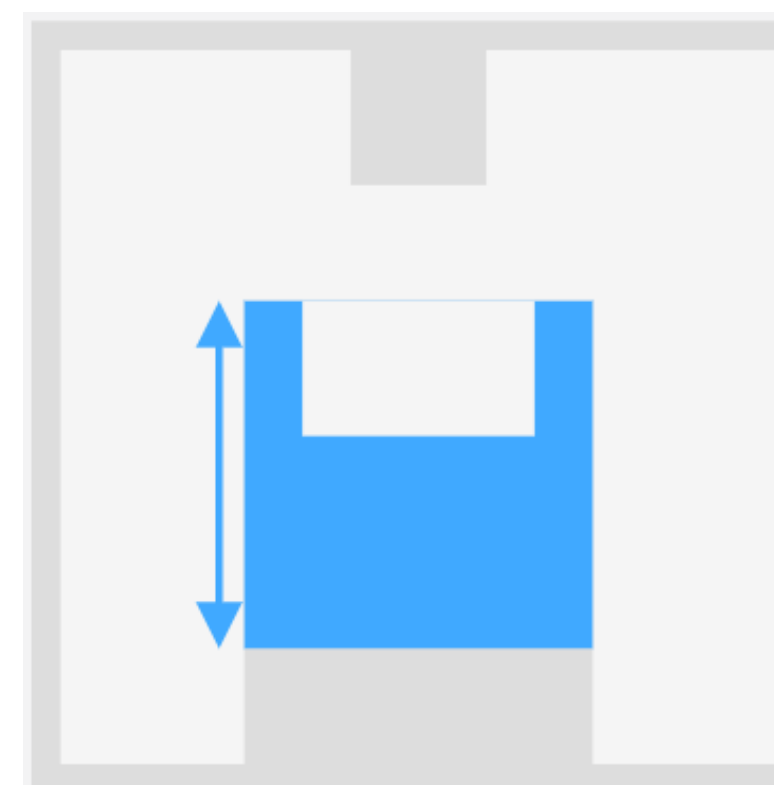
✓ Edge rounding:



✓ Temperature Compensate Structure

Non-Partial  Partial ⓘ

Resonator Radius	0.463	cm	Resonator Height	2.91	cm
Top Partial Length	1.736	cm	Bottom Partial Length	1.174	cm



### Temperature Compensation

Top Partial	Invar: 1.2x1e-6	▼	
Bottom Partial	Aluminum: 23x1e-6	▼	
Tuning Screw	Steel 410: 10.2x1e-6	▼	
From -30	°C	To 80	°C

**Obtain Compensated Structure**

# 3D Modeling Function—Adjacent Coupling Analysis



1 Coupling Structure
2 Modeling & Simulation

Key Variables					
Iris Width	3.15	cm	Coupling Screw Radius	0.25	cm
Iris Thickness	0.63	cm	Coupling Screw Depth	0.875	cm
Iris Depth	2.33	cm			

Optional Variables	
Shift	0 cm

The cavity geometrical parameters will be carried over from the single cavity design page. User is not allowed to change it in the Input/output coupling scheme page.

Set as Main Coupling
Next Step

4 Coupling schemes with 3 different resonator geometries: up to 45 models available



Up Window



Through Window



Loop Coupling



Coupling Probe

## Mesh set up & Parametric Analysis

**Mesh Setting**

Add

**Mesh Method**
 Auto
  TAU
  Classic

Apply curvilinear meshing to all curved surfaces

Structure	Length of Tetrahedral Element	Restrict No. of Additional Element
Cavity	1.4	1000

**Parameter Sweep**

Linear Step
 Linear Count

Sweeping Variable	From	To	Count
Tuning Screw Depth	0	0	0

# 3D Modeling Function—Input/Output Analysis



Coupling  I/O Coupling

1 Coupling Structure 2 Modeling & Simulation

Port Height	2.625	cm									
Connector Type	SMA	▼	R In	0.127	cm	R Out	0.42	cm	Port L	2.6	cm

The cavity geometrical parameters will be carried over from the single cavity design page. User is not allowed to change it in the Input/output coupling scheme page.

## Easy to set up & Parametric Analysis

Parameter Sweep  Linear Step  Linear Count

Sweeping Variable	From	To	Count
Tuning Screw Depth ▼	0	0	0

3 popular in/out put structures are provided



Tab Coupling



Disk Coupling



Loop Coupling

# 3D Modeling Function—Full 3D Layout Design



Auto Center

Main Body Design > **2 Cross Coupled Structure** > 3 Modeling

S — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — L

Add Coupled Structure

Trans Zero 1	Cavity1	Cavity3	Disk Probe 1	Electrical	✕
Trans Zero 2	Cavity3	Cavity5	Disk Probe 1	Electrical	✕
Trans Zero 3	Cavity5	Cavity8	Disk Probe 1	Electrical	✕
Trans Zero 4	Cavity6	Cavity8	Disk Probe 1	Electrical	✕

Disk Thickness 0.26 cm ✓  
Disk Radius 0.52 cm ✓  
Rod Radius 0.13 cm ✓  
Rod Height 1.165 cm ✓

- ✓ Full 3D modeling: arbitrary layout design;
- ✓ Uniform & Non-uniform cavity and coupling iris definition;
- ✓ 5 cross coupled structures are available to different cross coupling application;
- ✓ Parameterized modeling work to allow user to make the modification in further;

Ex: 8 poles filter with 4 transmission zeros