

The demand for MEMS is skyrocketing, and designers face the challenge of optimizing increasingly complex systems within tight development cycles. A comprehensive and intuitive MEMS design software is essential.

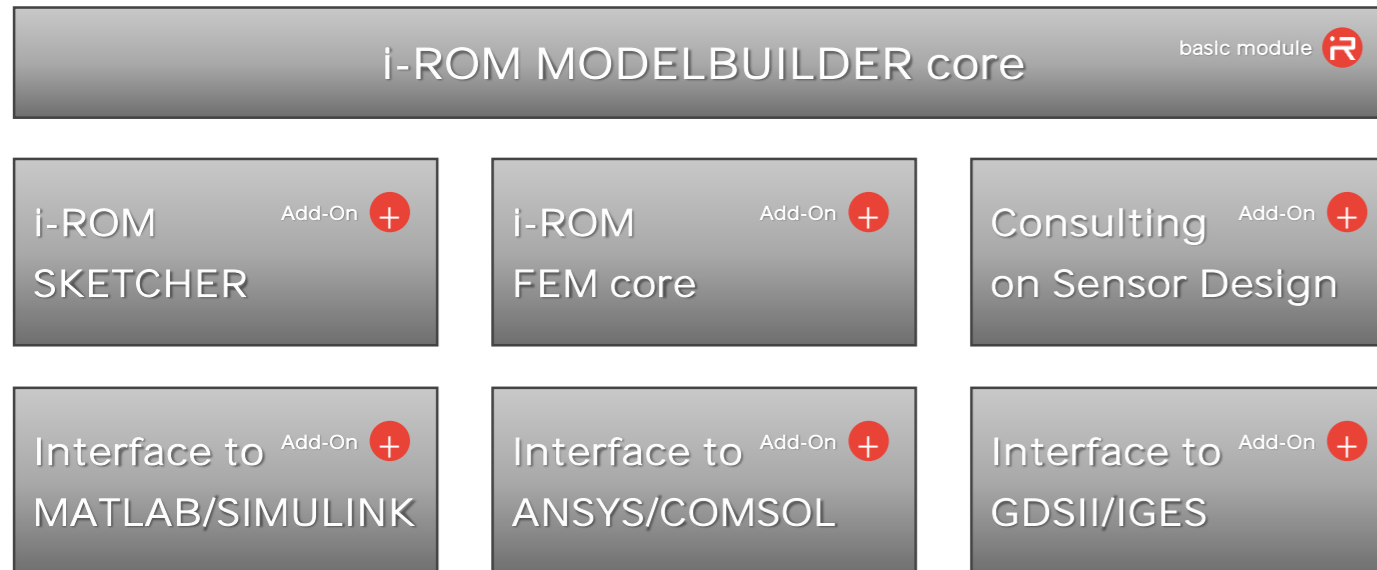
Developed using the latest scientific theories and tailored to the needs of MEMS designers, MODELBUILDER empowers you to design, analyze, and optimize your next-generation MEMS with ease.

Why Choose the i-ROM MODELBUILDER?

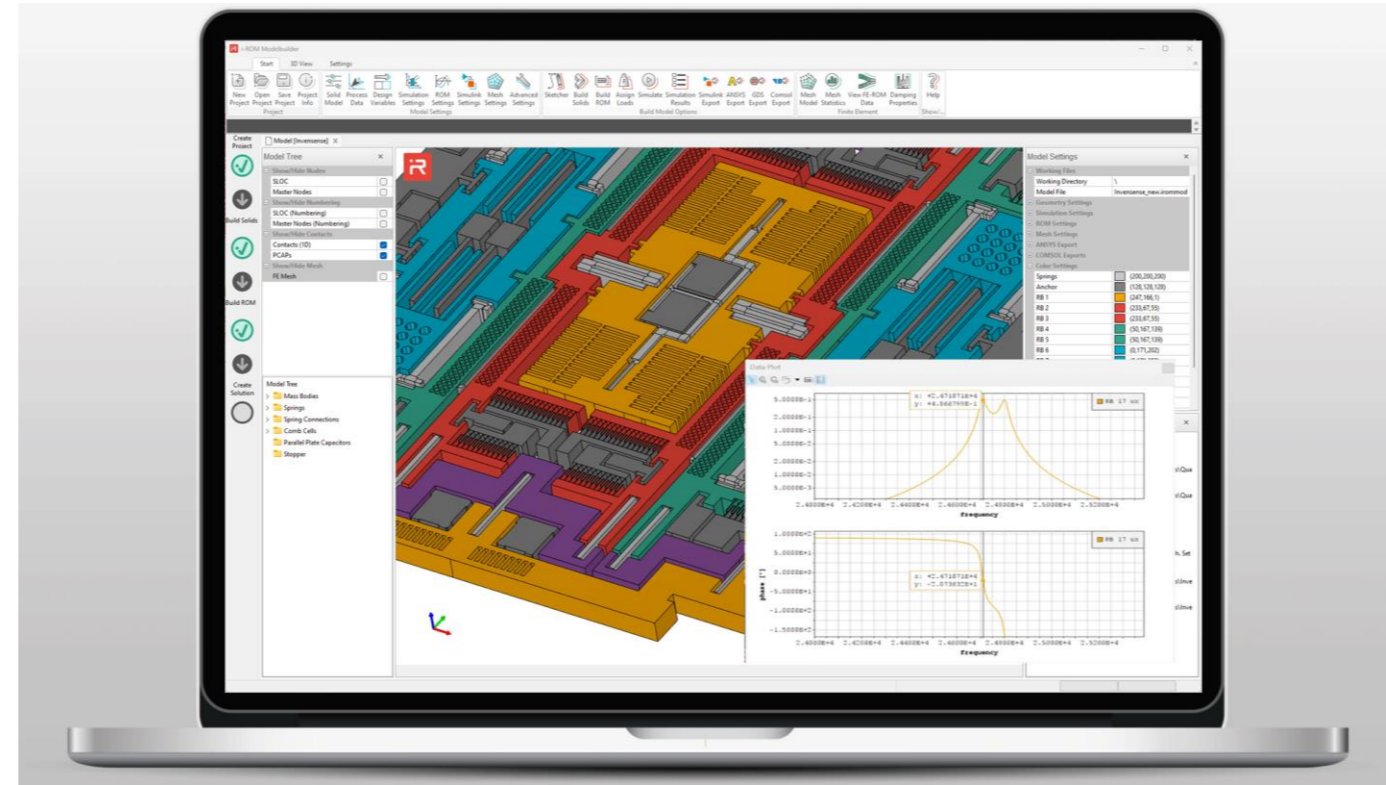
Our software stands out from traditional finite element tools by incorporating cutting-edge algorithms designed specifically for MEMS applications:

- **Rapid Simulation with Model Order Reduction:** Simulate even the most complicated MEMS designs quickly and efficiently.
- **Fully Coupled Physical Domains:** Precisely analyze the interactions and nonlinearities across different physical domains in MEMS.
- **Manufacturing-Specific Data (PDKs):** Integrate manufacturing data seamlessly and export optimized MEMS models for electronic design automation.

i-ROM Software Suite



MEMS Design Automation



i-ROM
MAKING MEMS DESIGN EASY

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www.i-rom.de



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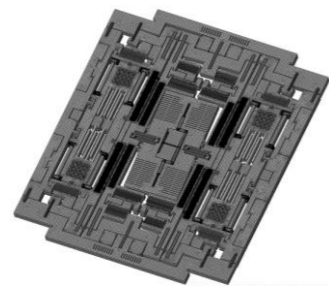
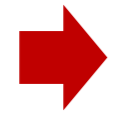
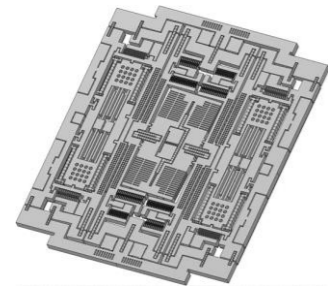
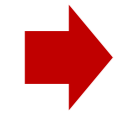
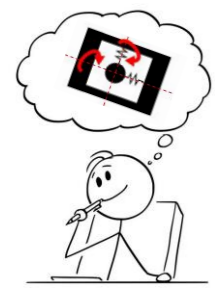
i-ROM
MAKING MEMS DESIGN EASY

MEMS Design and Simulation Software

www.i-rom.de

Bring your product idea to life

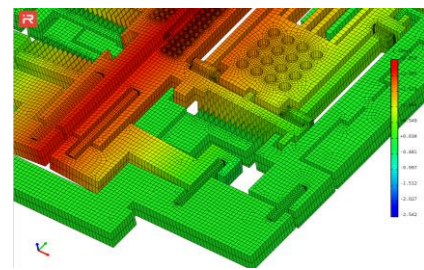
Conceptual design phase Component design phase



Initial idea Quasi-analytical approach Finite element technology

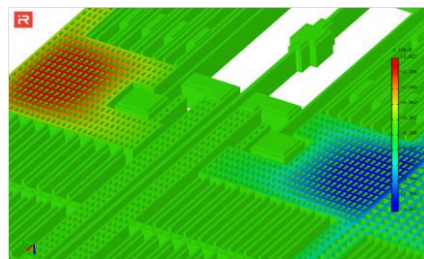
REDUCED ORDER MODELING

We offer a comprehensive MEMS Design Software Suite, enabling the simulation of entire sensor designs on your computer. Utilizing **Reduced Order Modeling (ROM)** significantly reduces computational complexity and enables efficient numerical simulations.



Electrostatic domain

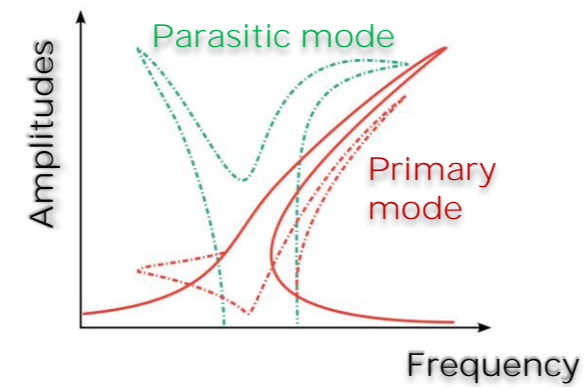
Mechanical domain



Fluidic damping

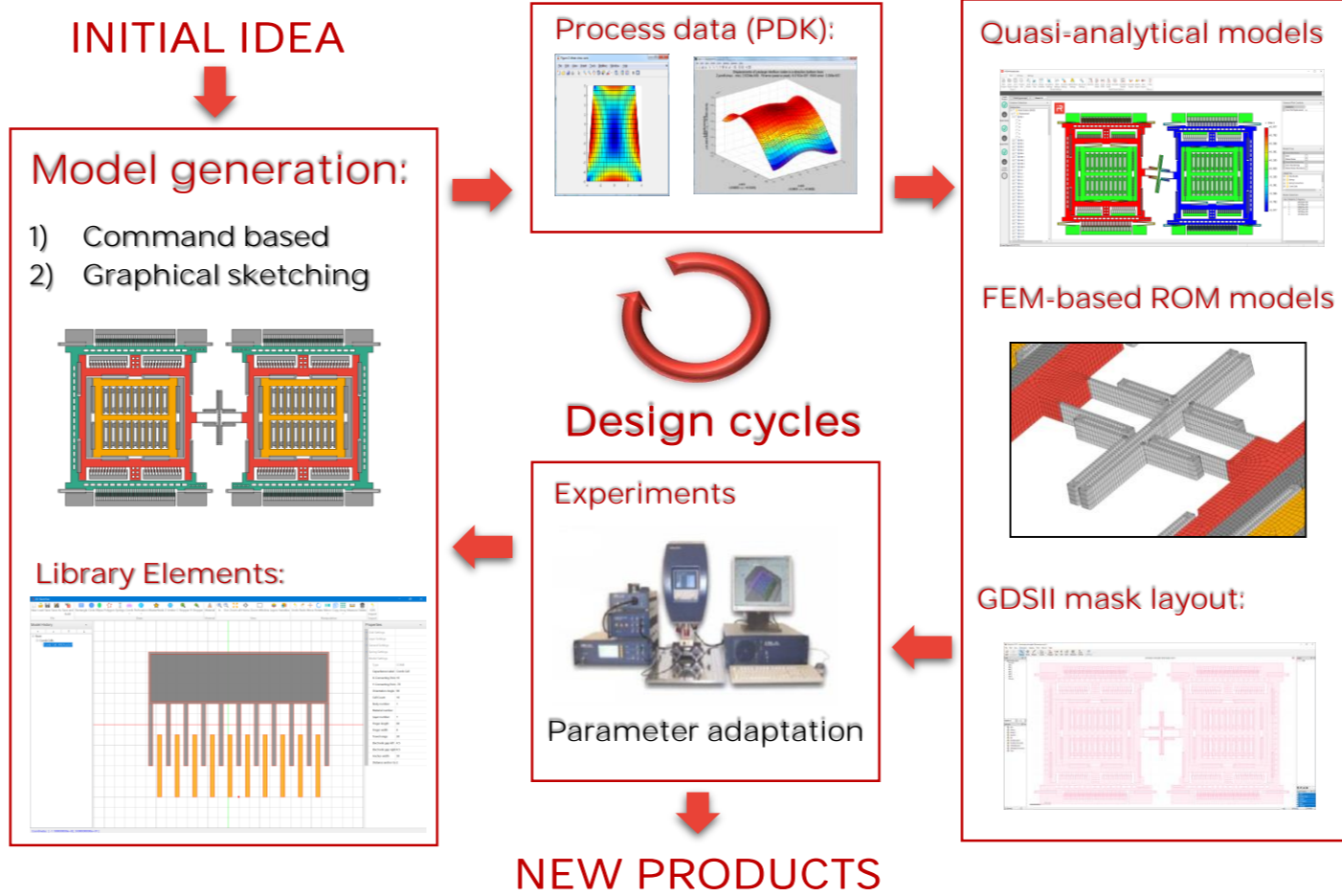


Coupled domain simulations

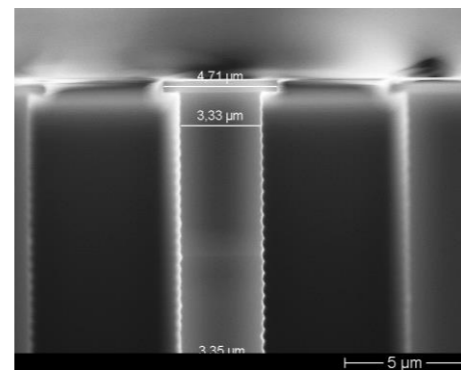


- Fast MEMS-specific FEM algorithms
- Fully automated ROM generation

Design flow of the MODELBUILDER

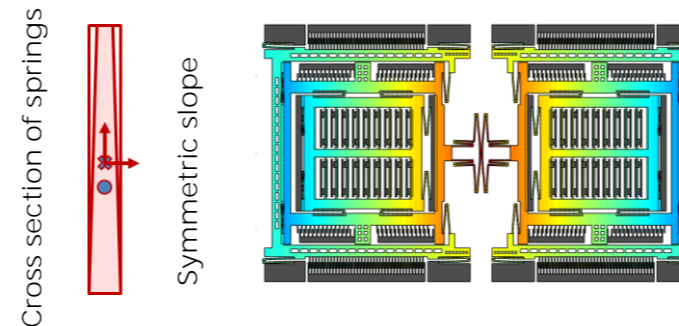


Automated use of Process Data Kits (PDK) for MEMS performance and yield analysis



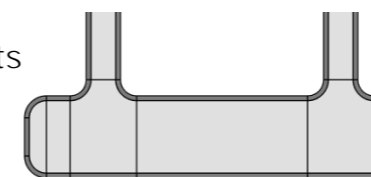
➤ Edge Side Wall Slopes

Quadrature of the sense mode caused by sidewall etch slopes:



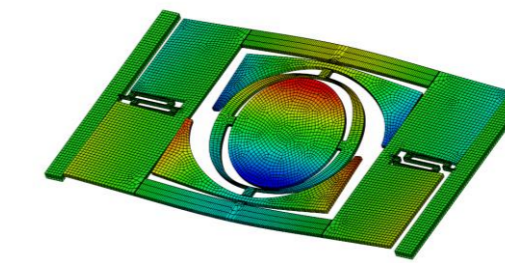
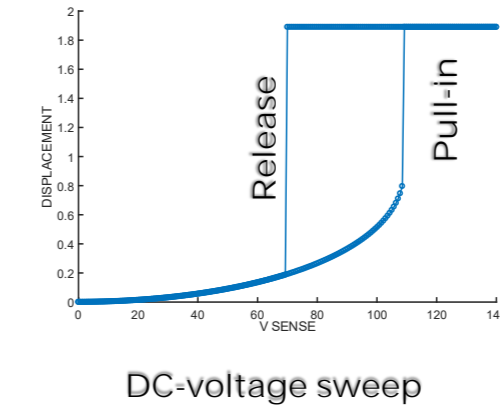
➤ Corner Rounding

Spring corner fillets are automatically applied

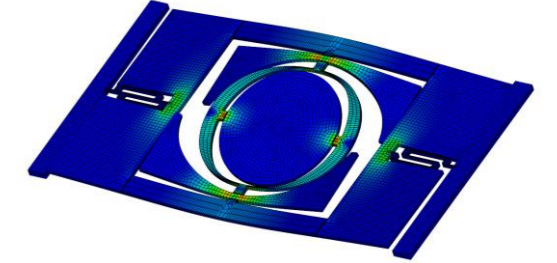
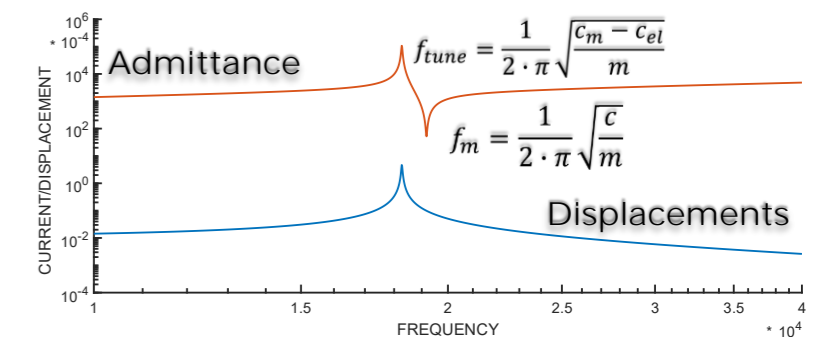


Process Data Settings	Value	Enable
Mask Undercut	0.1	
Sidewall Etch Offset North	-0.5	
Sidewall Etch Offset South	-0.5	
Sidewall Etch Offset East	-0.5	
Sidewall Etch Offset West	-0.5	
Sidewall Etch Offset North-East	0	
Sidewall Etch Offset South-East	0	
Sidewall Etch Offset South-West	0	
Sidewall Etch Offset North-West	0	
Fillet Radius Spring-Spring-Junction	2	
Fillet Radius Spring-Mass-Junction	3	
Corner Fillet/Rounding global on/off	<input checked="" type="checkbox"/>	
Mask Undercut global on/off	<input checked="" type="checkbox"/>	
Sidewall Etch global on/off	<input checked="" type="checkbox"/>	

Modeling and simulation features



Out-of-plane displacements



Von Mises stress contour plot

Simulation of all mechanical and electrical domain quantities:

- Displacements, stresses, contact and reacting forces
- Capacitances, voltage-current functions (Impedances)

Interactions of coupled domains:

- Electrostatic softening effects
- Pull-in and release voltages
- Viscose damping, Q-factors

Export interfaces: Contact bouncing at travel stops in Matlab/Simulink

