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QFINSOFT
TECHNOLOGY INC.

Design and Optimization of Electronic Systems Using Qfin

专业的电子
热设计优化软件



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Qfinsoft Office



Heat Sinks:



- In Nov 1998 Qfin 2.0 was released with the first sale to Cisco in Santa Clara.
- In 1999 this was followed by the release of Qfin 2.1 which included optimization
- In 2003 Qfin 3.0 was released
- In 2004 Qfin 3.1 was released with advanced optimization features



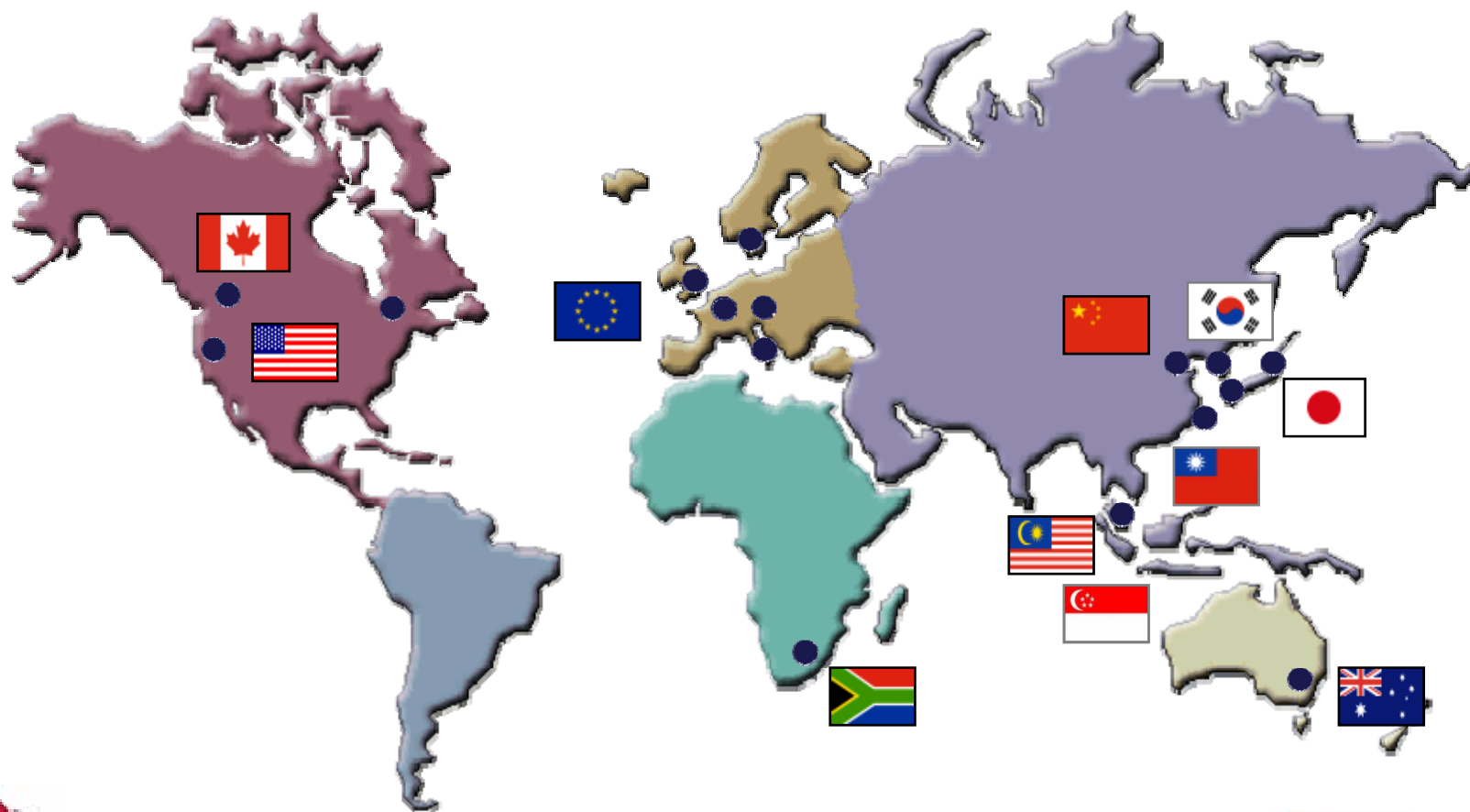
Heat Sinks and Cold Plates:

- In Nov 2004 Qfin 4.0 Basic and Standard was released
- Introduction of System CFD solver
- First multi-fluid applications
- In March 2006 Qfin 4.0 Advanced was released complete system level capabilities
- In 2007 Introduction of Sub-modules like TEC
- Febr 2008 Introduction of the LED component



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. fin orldwide



➤ 什么是Qfin?

- Qfin的技术特点

- 应用实例



➤ 可求解多种物理模型

Steady or transient analysis

稳态，瞬态分析

Laminar or turbulent flow

层流，湍流

Forced, natural, or mixed convection heat transfer

强迫，自然，混合对流换热

Surface-to-surface radiation

辐射

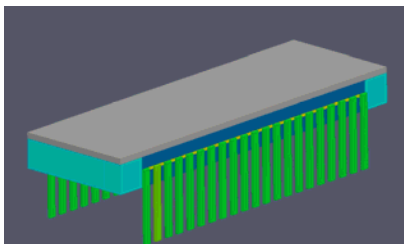
Conduction in solids

固体传导

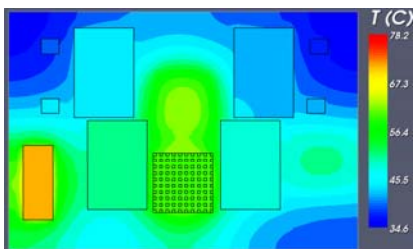


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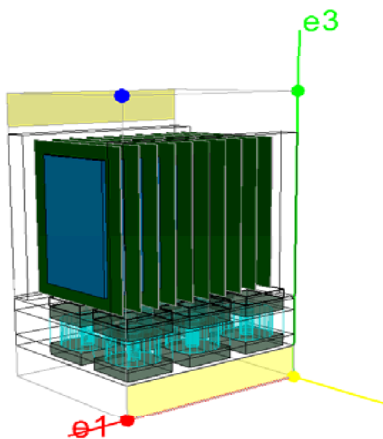
什么是Qfin



封装级 **Package Level**



板级 **PCB Level**



系统级 **System Level**

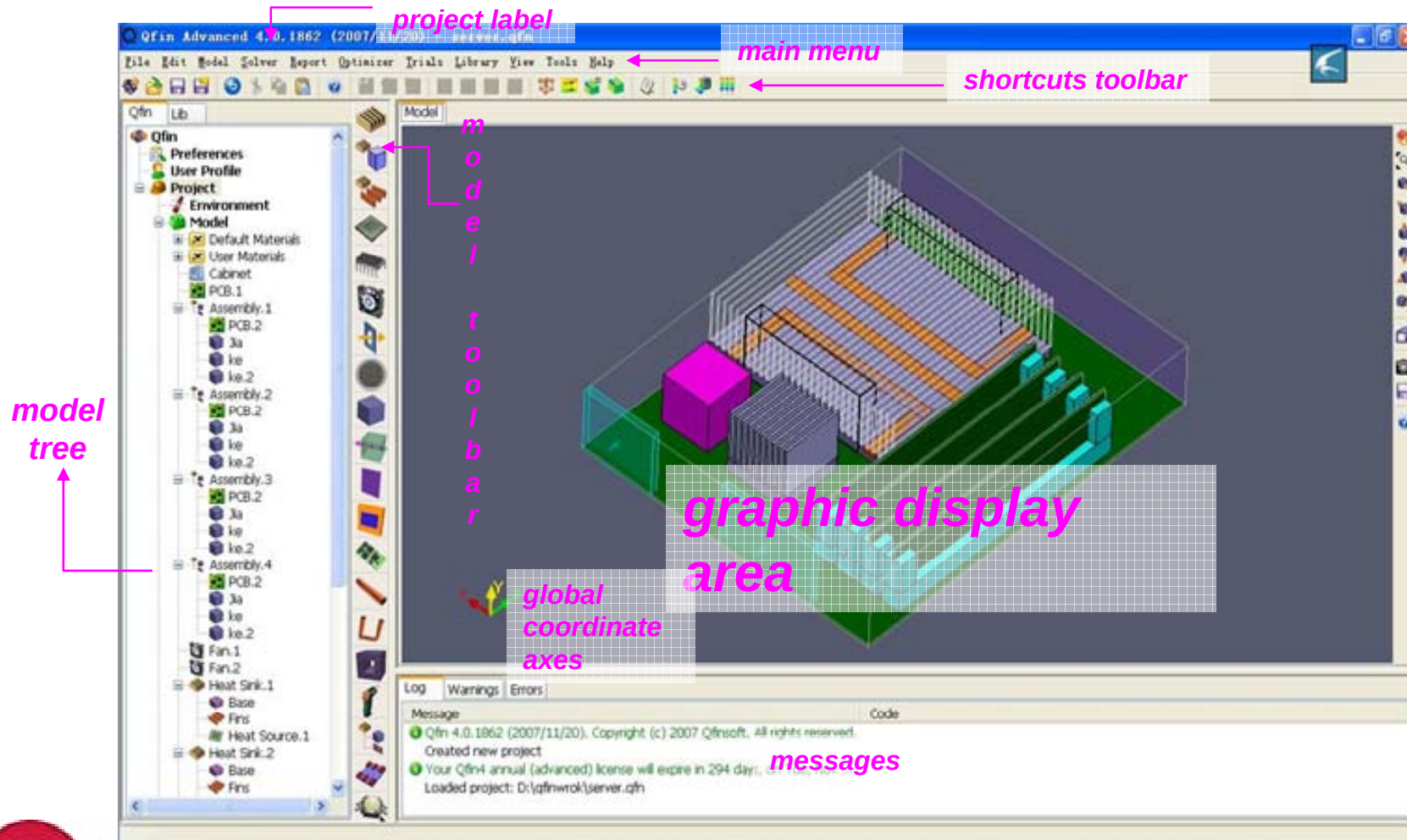


- 什么是Qfin?
- Qfin的技术特点
- 应用实例



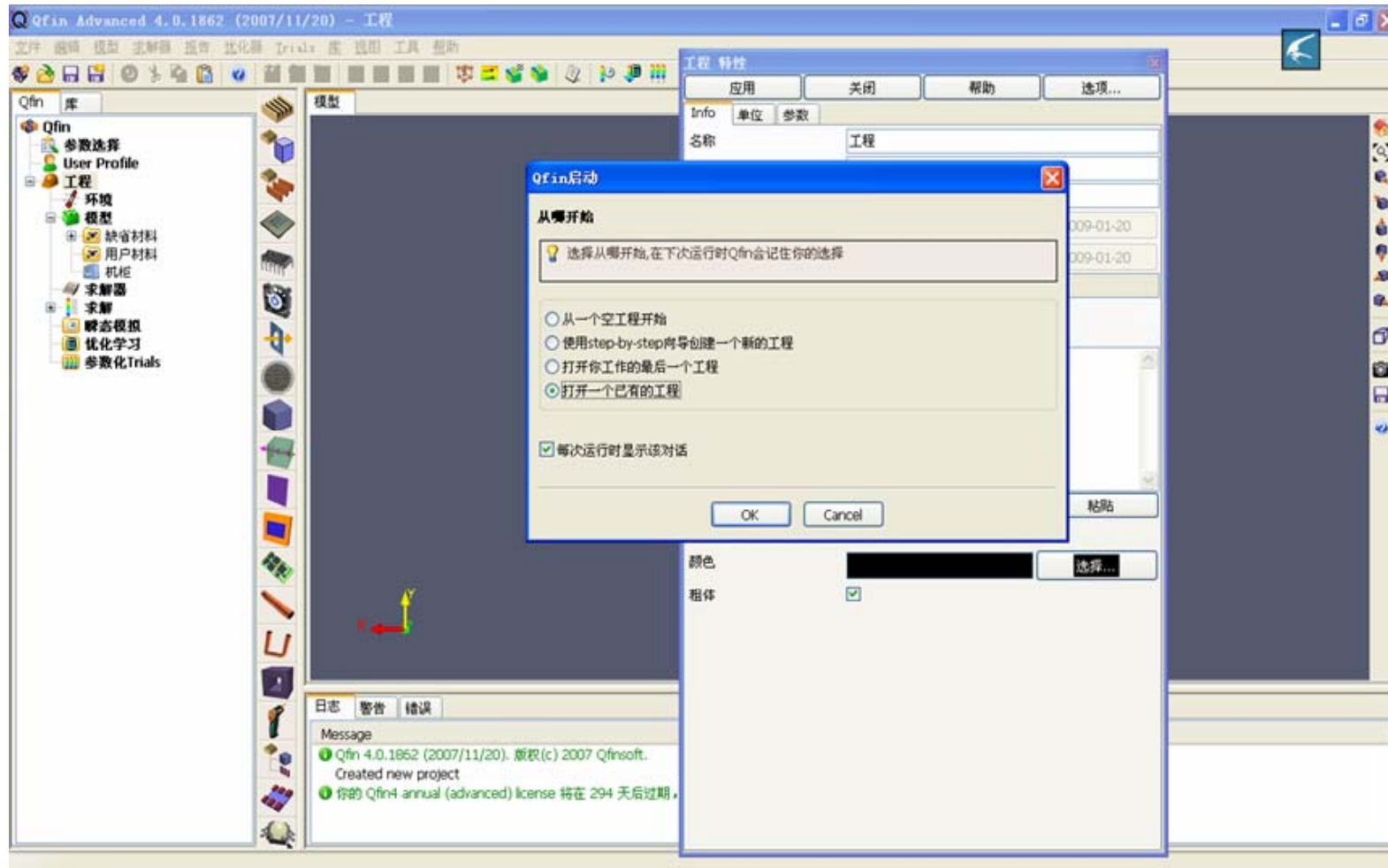
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Qfin GUI



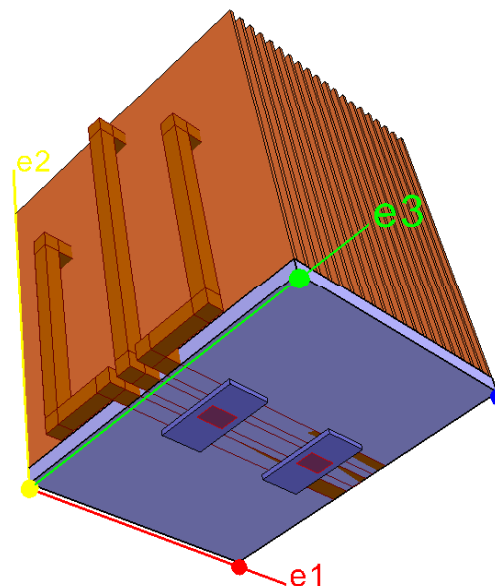
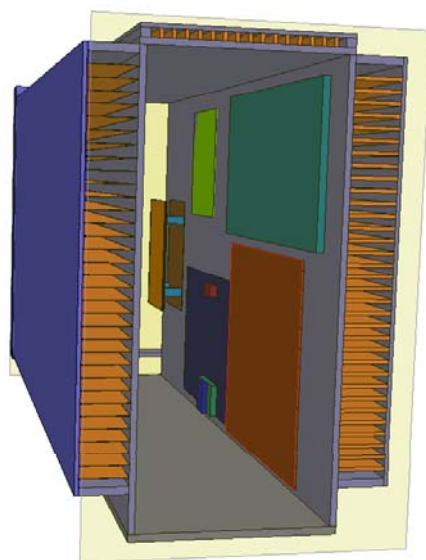
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Qfin 中文 GUI

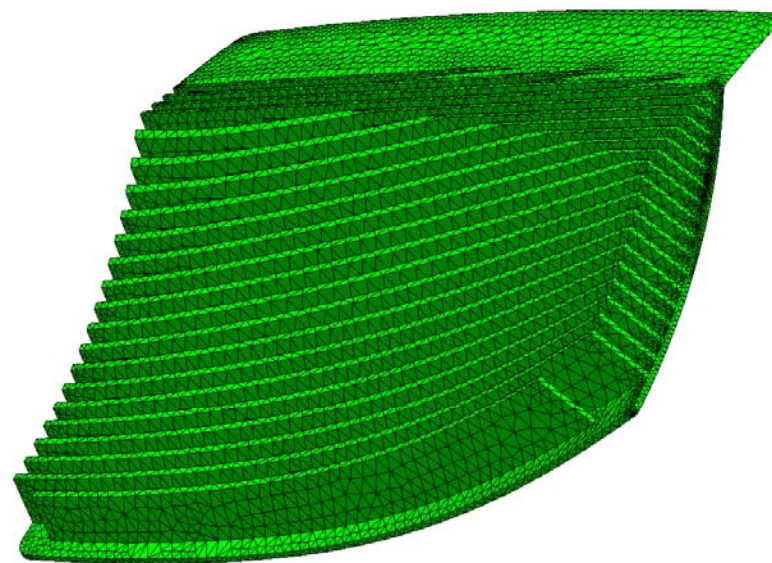
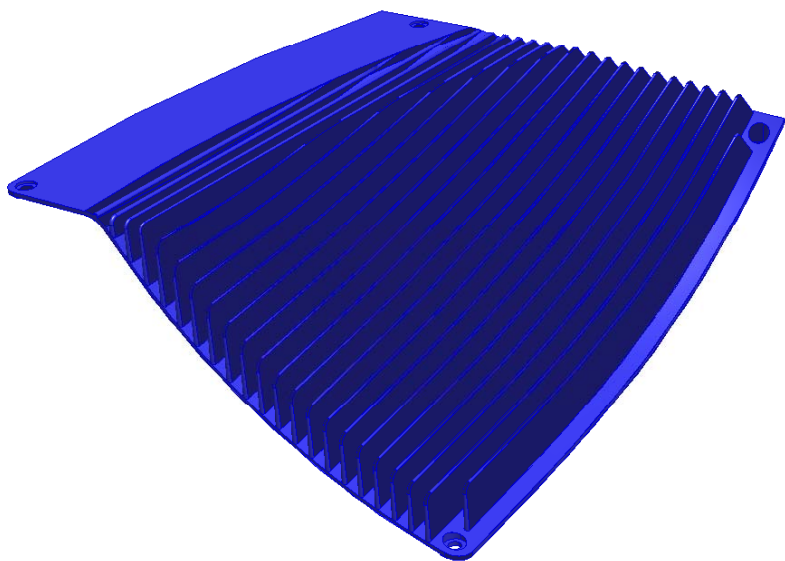


1. 强大的建模功能 (Model Building)

- Step-by-step design 向导式建模
- Geometric primitives 真实几何

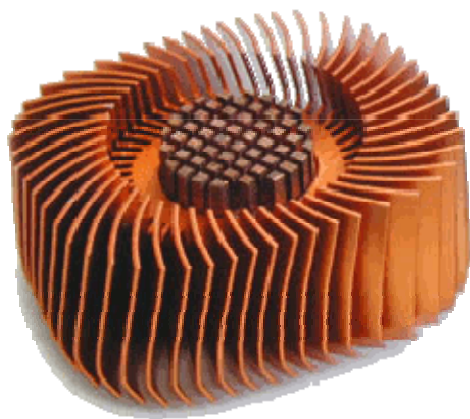
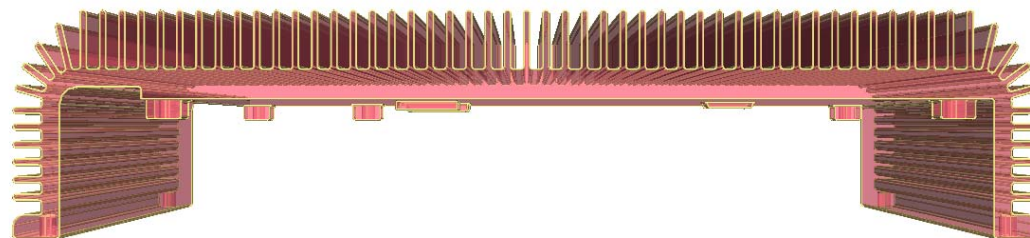
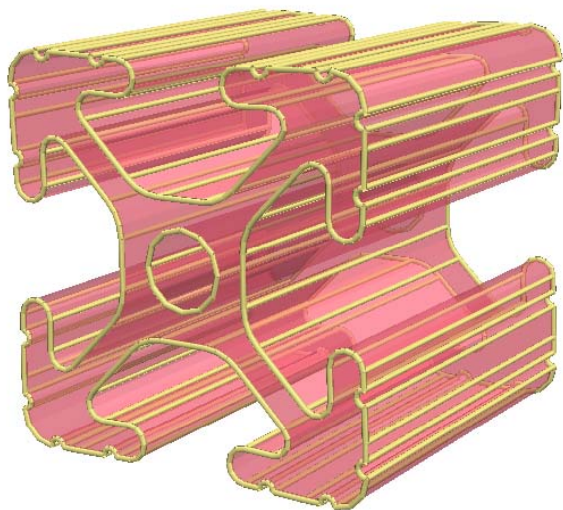


- MCAD Porting CAD直接输入



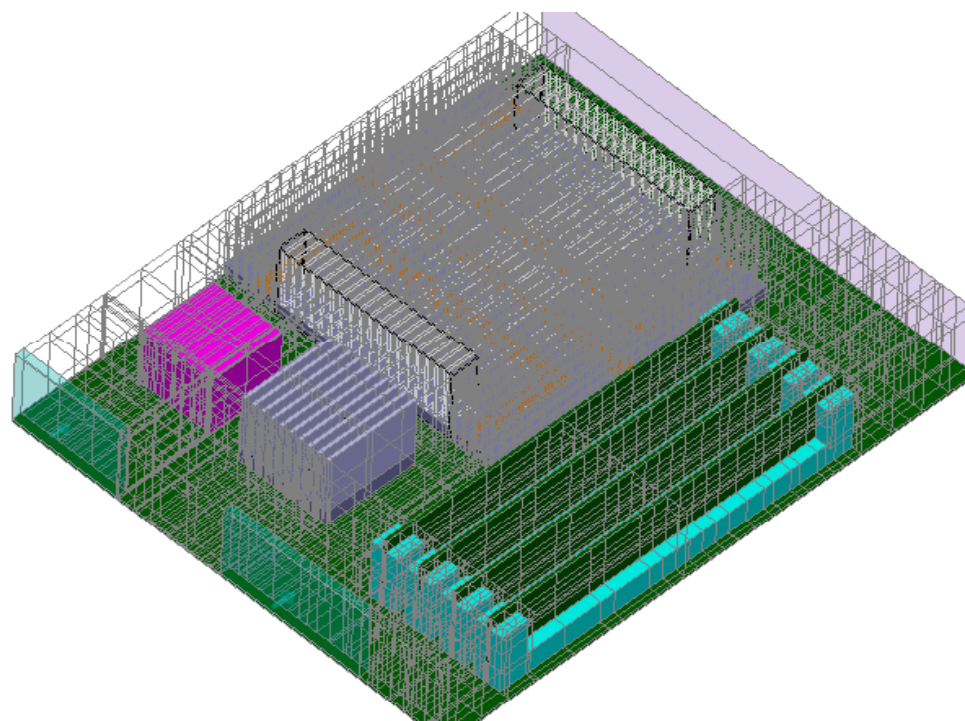
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与CAD的无缝导入



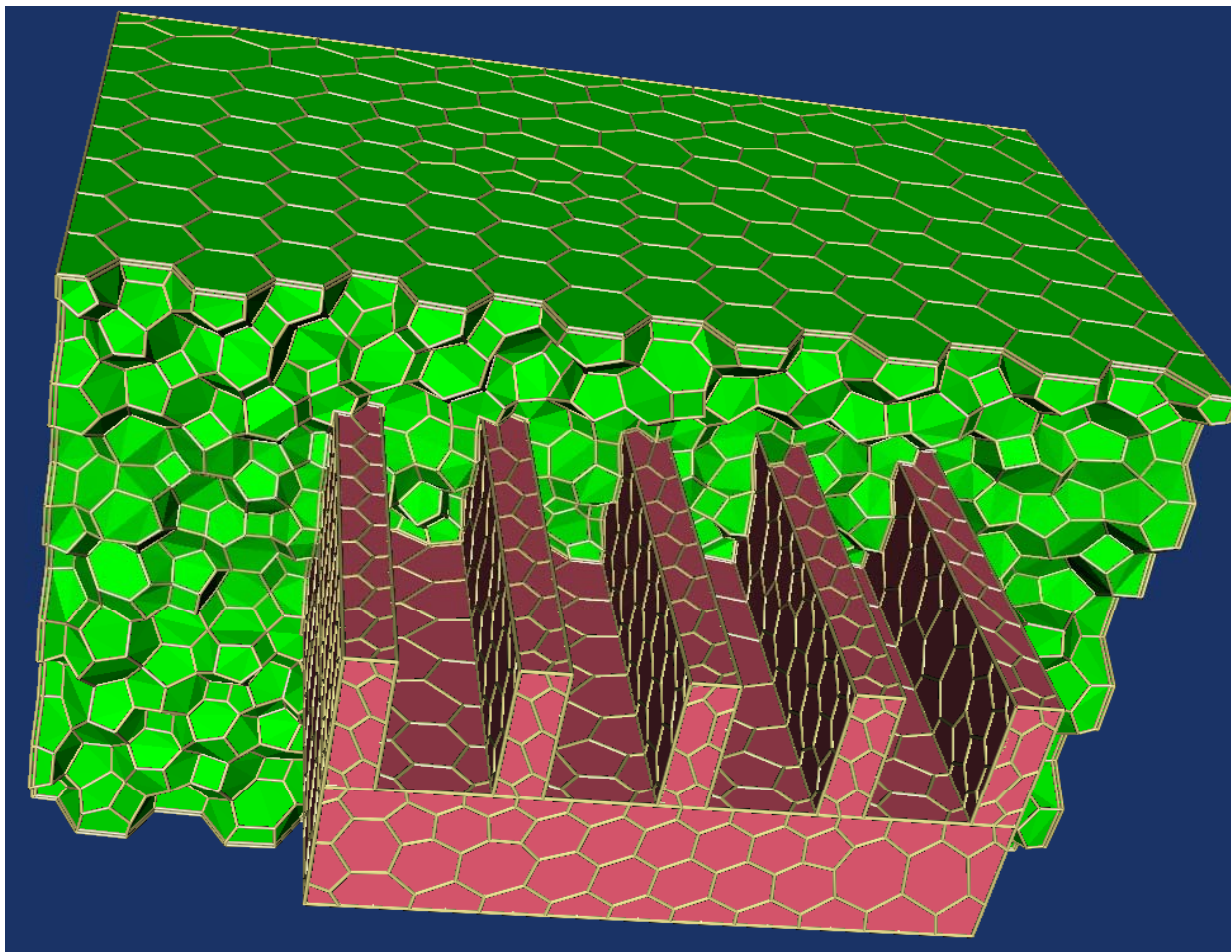
2. 先进的网格技术

Fully automatic 完全自动化的网格生成



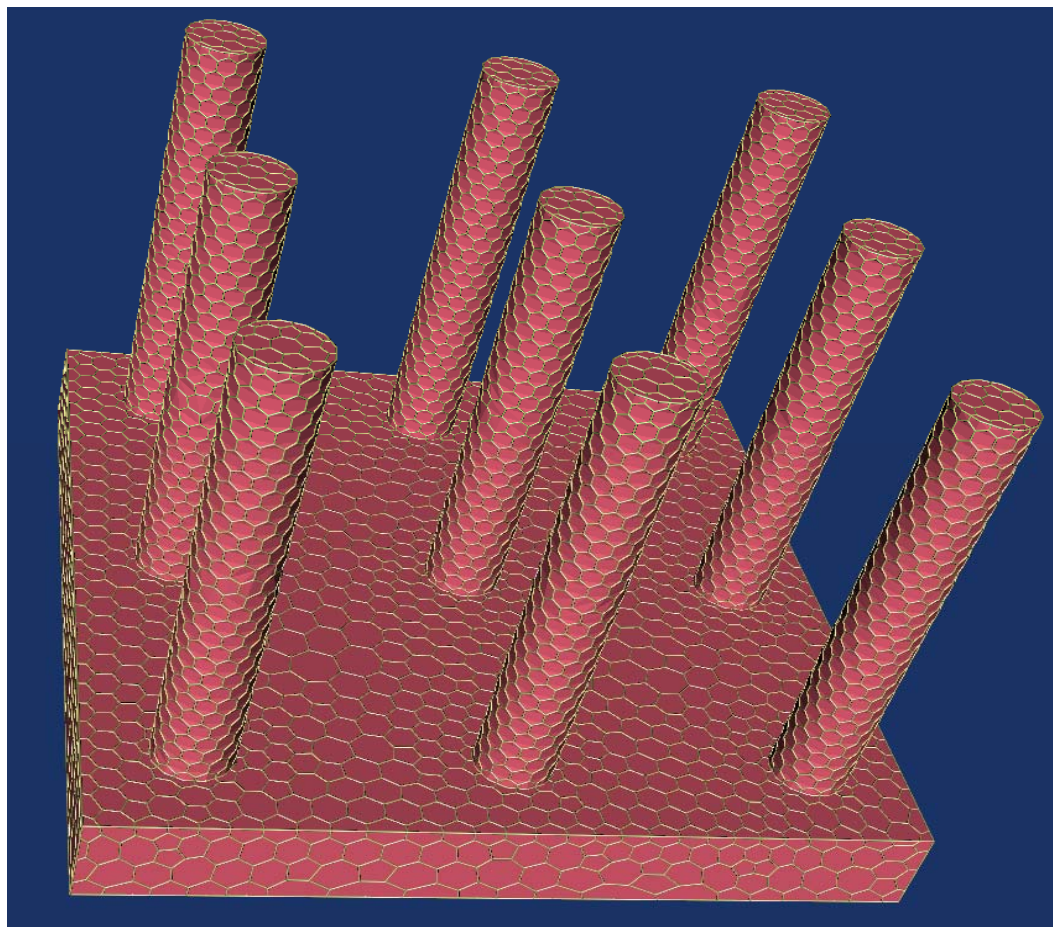
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Qfin的技术特点



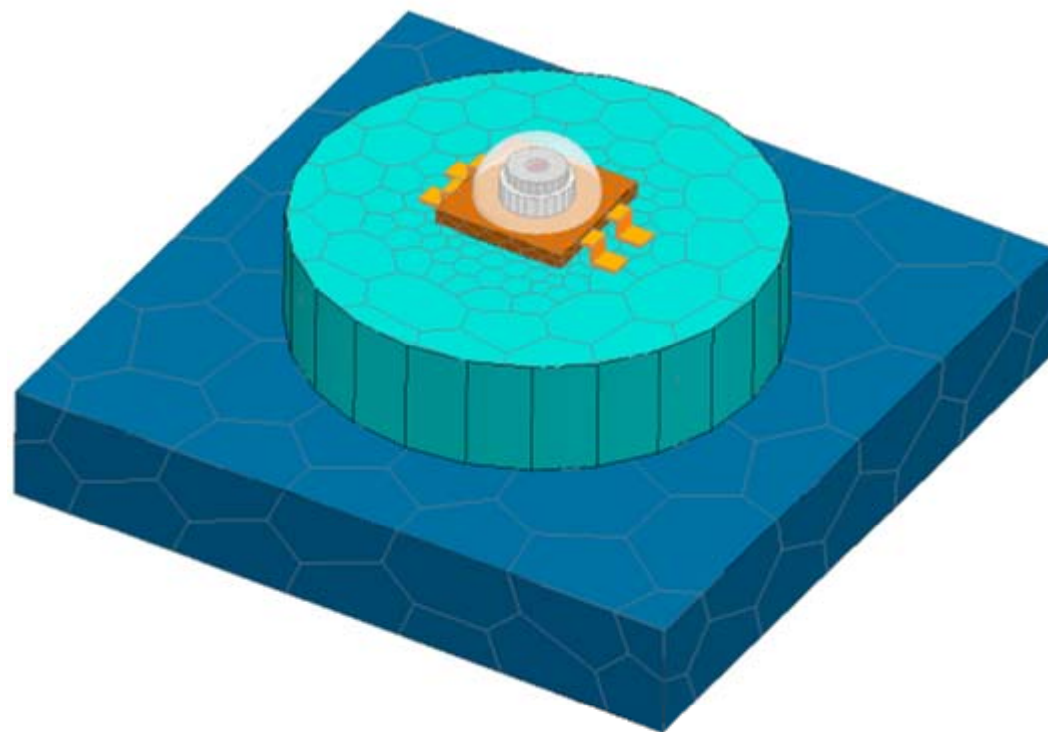
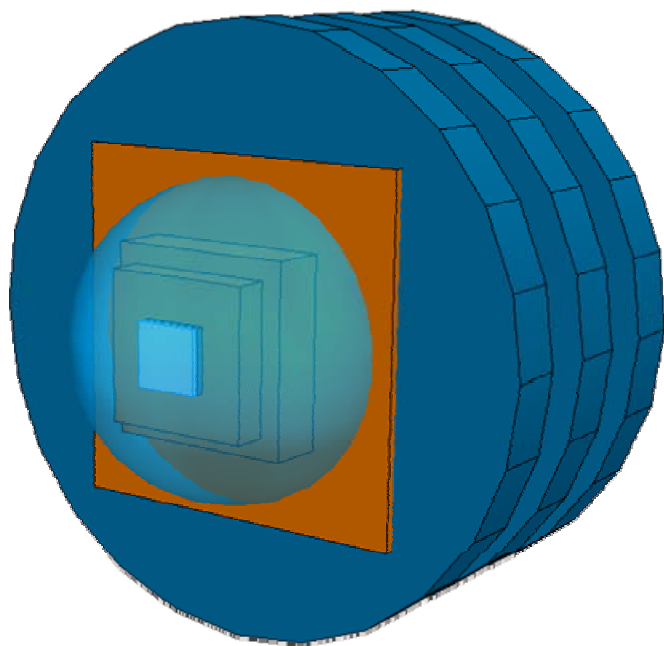
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Qfin的技术特点



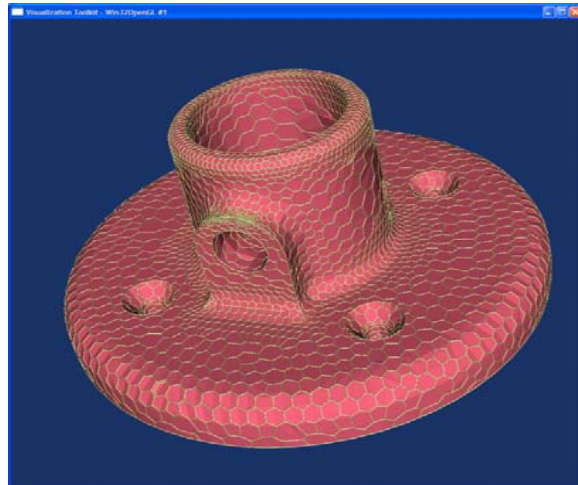
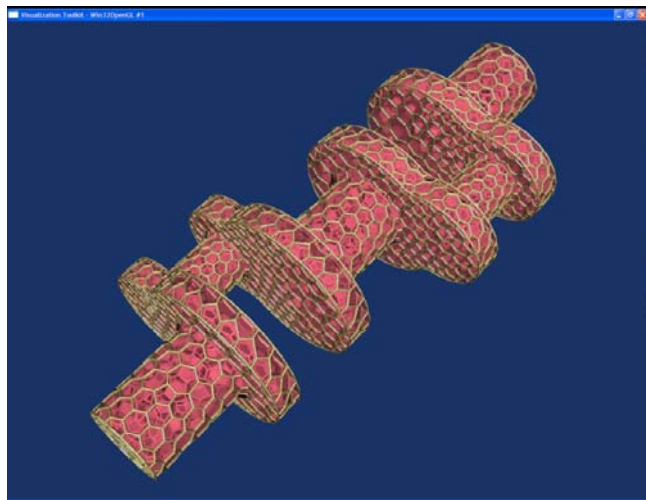
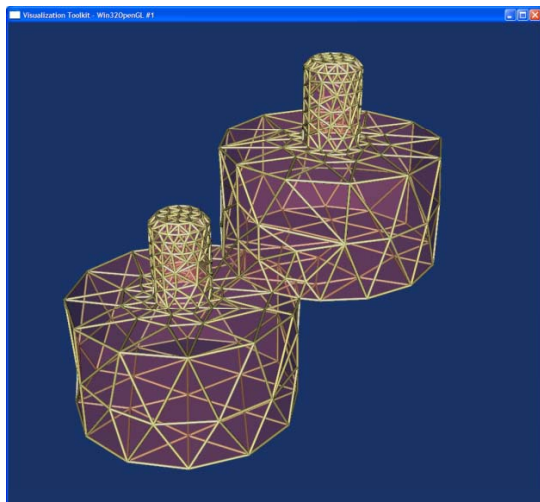
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ew网格技术



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Qfin的技术特点



3. 求解器

- 采用新型的System Cfd的求解器
- 所需计算的网格少，计算费效比低
- 求解极其稳定
- 可以在较短的时间内获得瞬态计算的结果
- 可以准确预测流体区域的过渡
- 非常合适的设计和优化工具



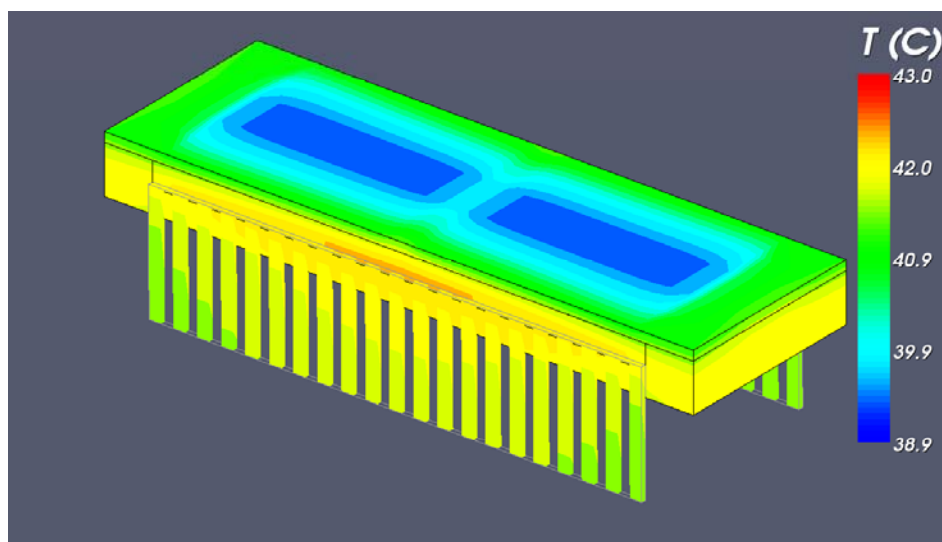
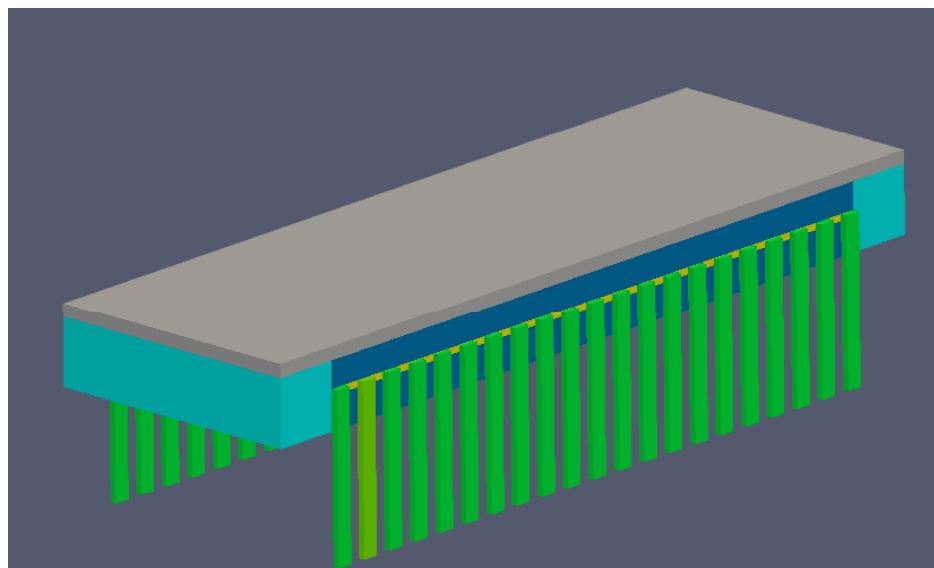
- 使用简单，提供向导式操作对话框
- 完整的预先定义元件，如散热片、TEC等
- 支持多流体模型
- 使用相对坐标系统，方便快捷
- 自动产生网格，同时可以细化网格
- 用户自定义库
- 最佳优化模式，支持多个变量与约束条件
- 自动计算辐射换热角系数



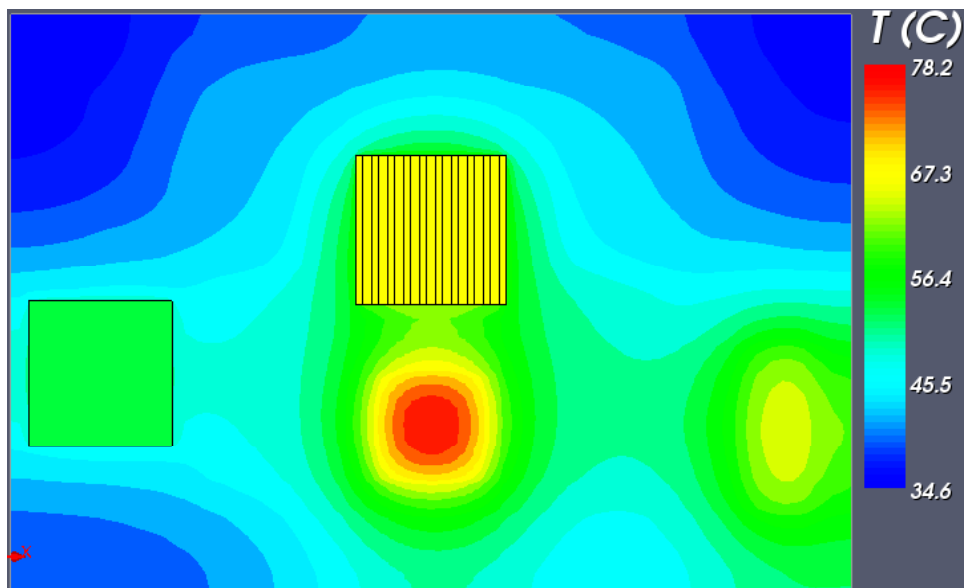
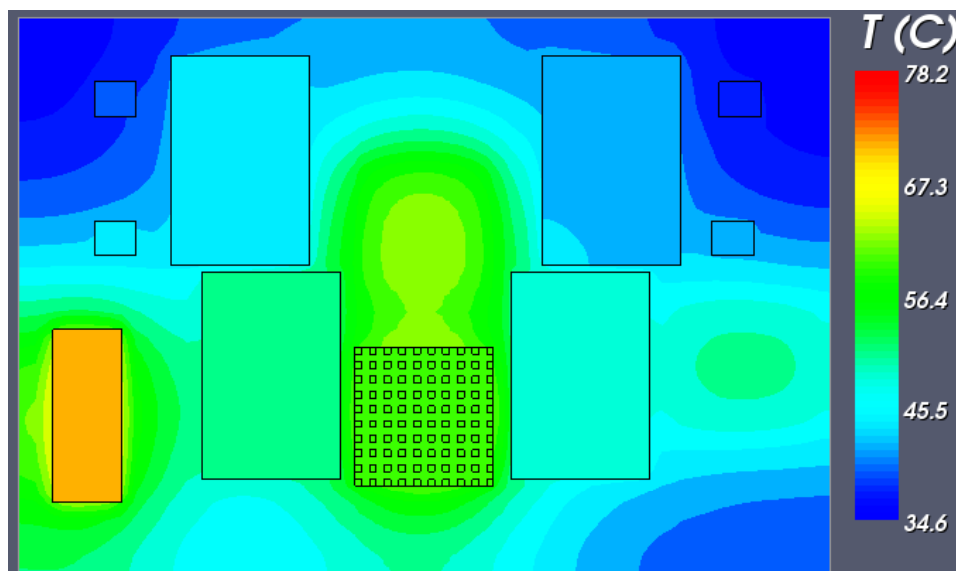
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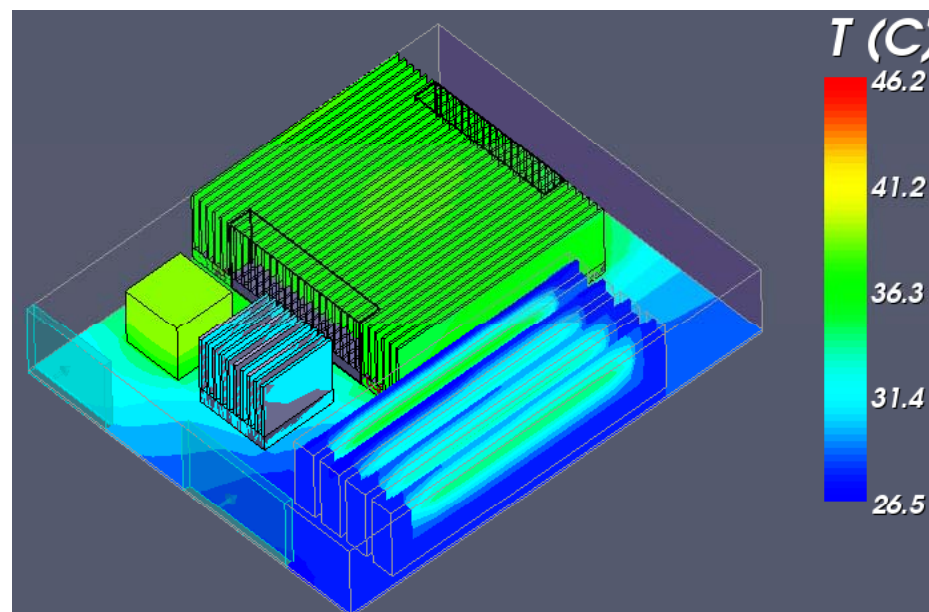
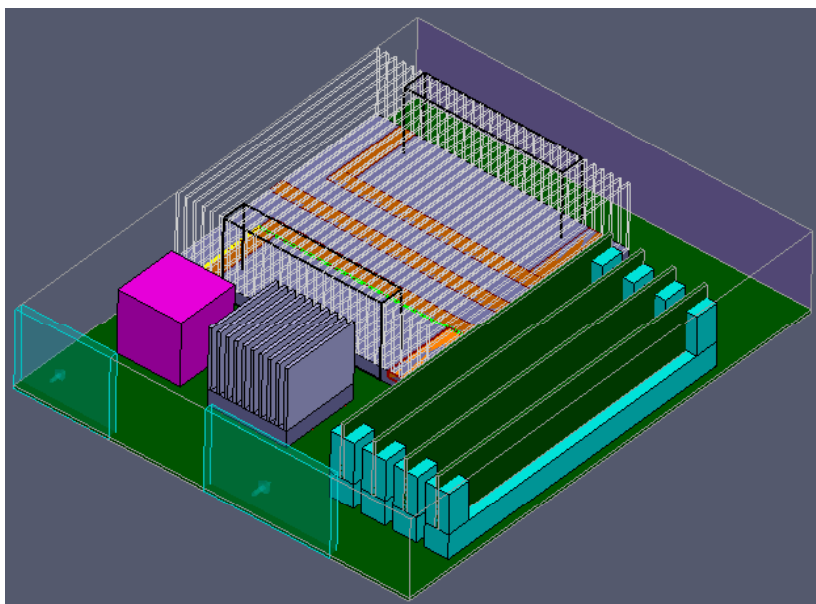


DIP芯片的自然冷却



PCB的自然冷却



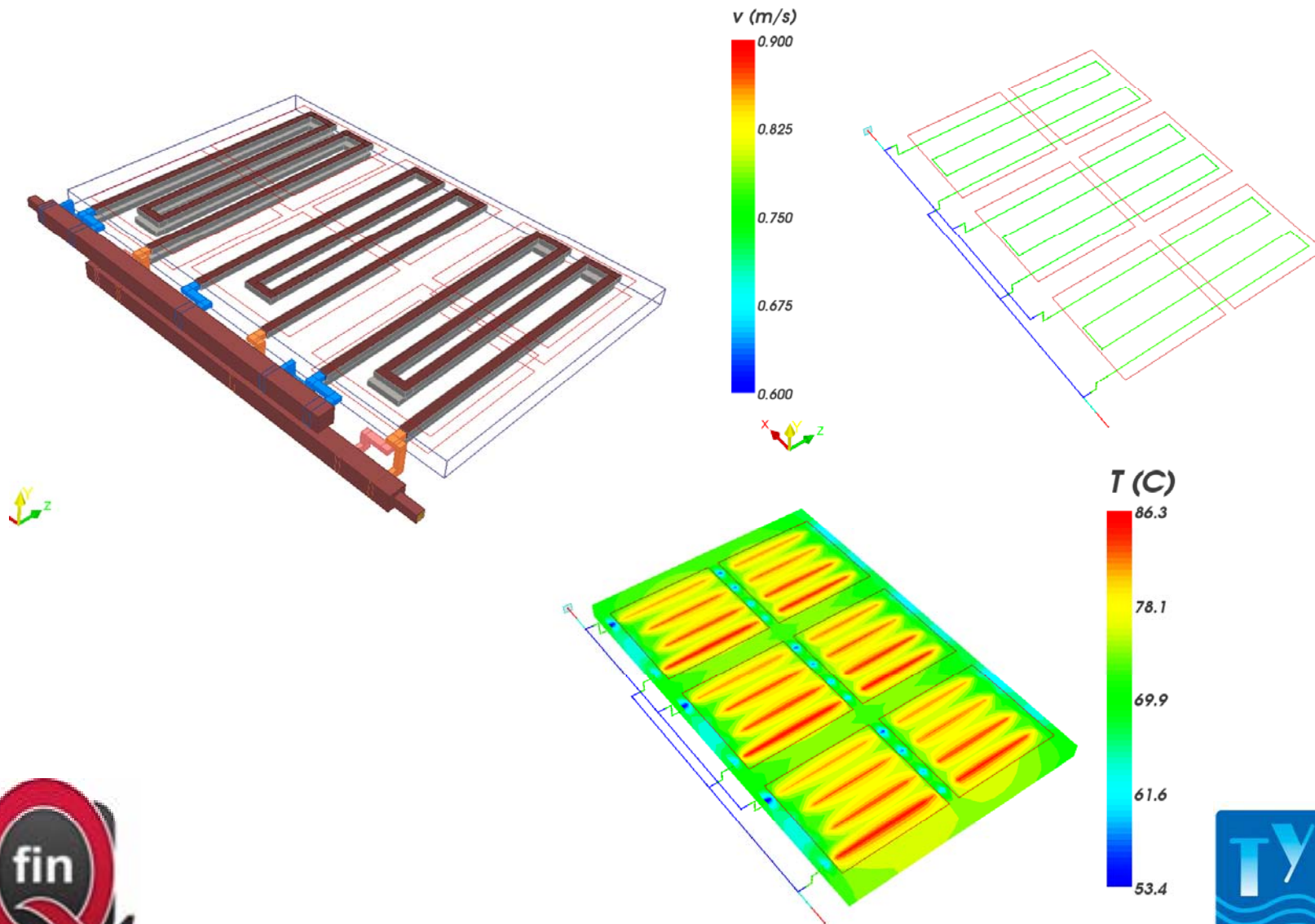


模型包括热管散热器、风扇、板卡等等



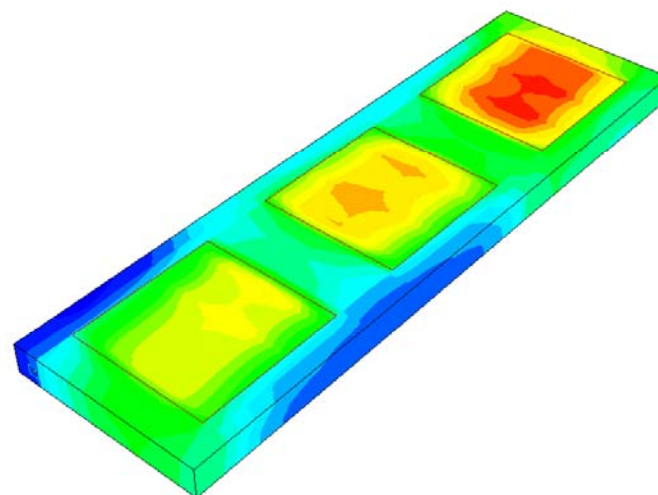
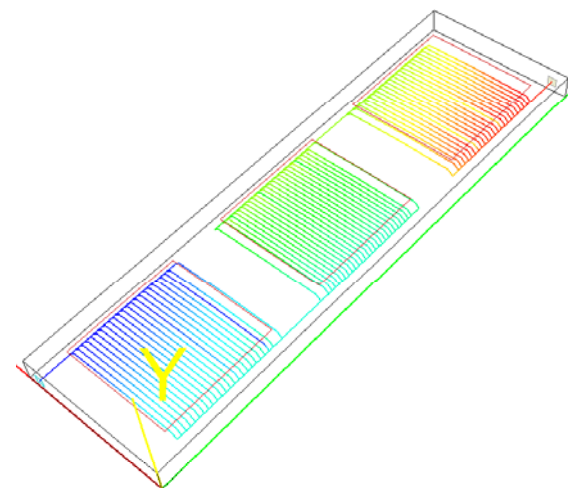
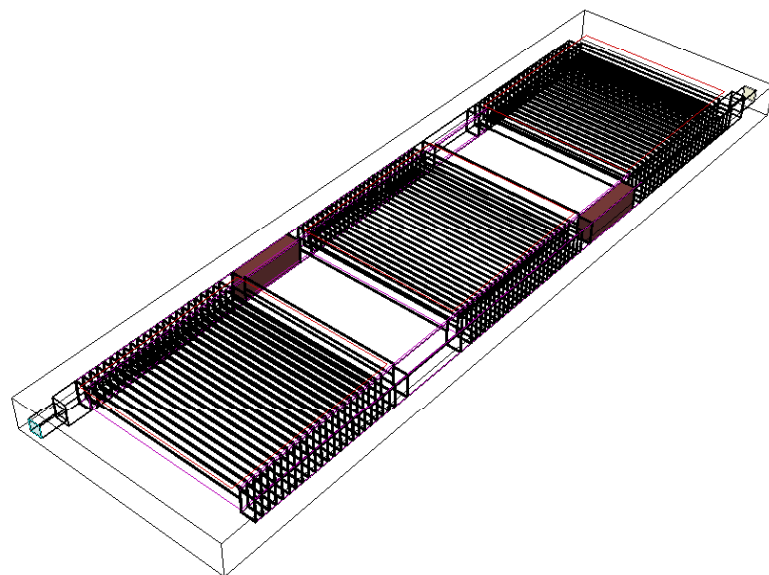
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Clod plate



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Clod plate



T (C)

53.5

48.2

42.9

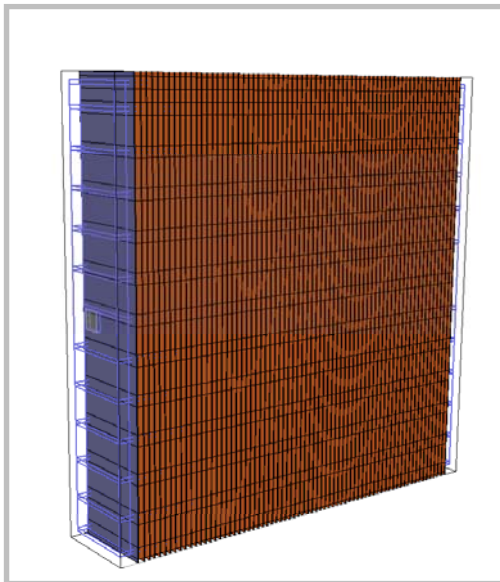
37.6

32.3

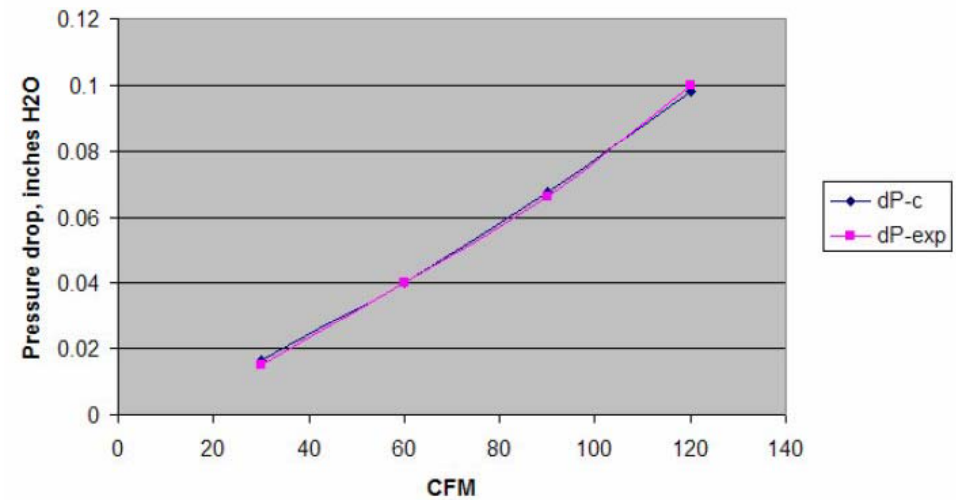


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tianyuantech

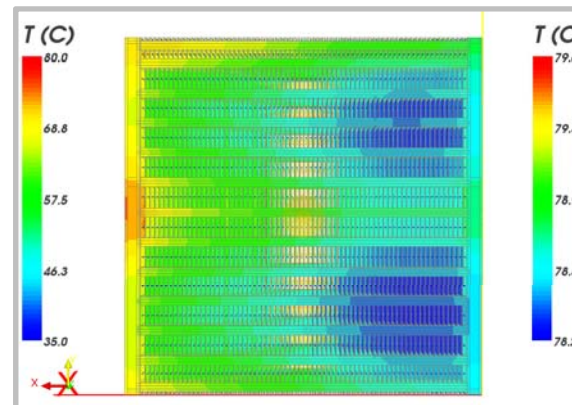
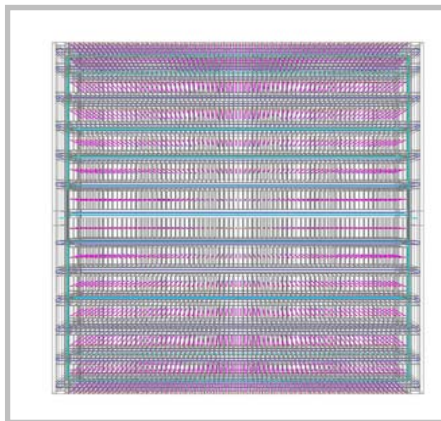
Heat Exchanger:



Comparison of Ad-hoc Qfin Model (1mm gap) and Experimental Wind Tunnel Measurement



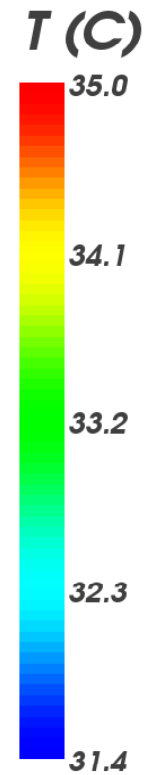
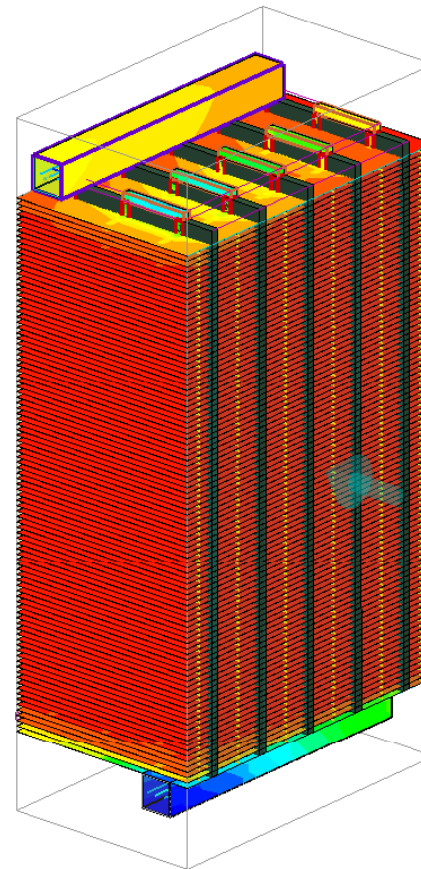
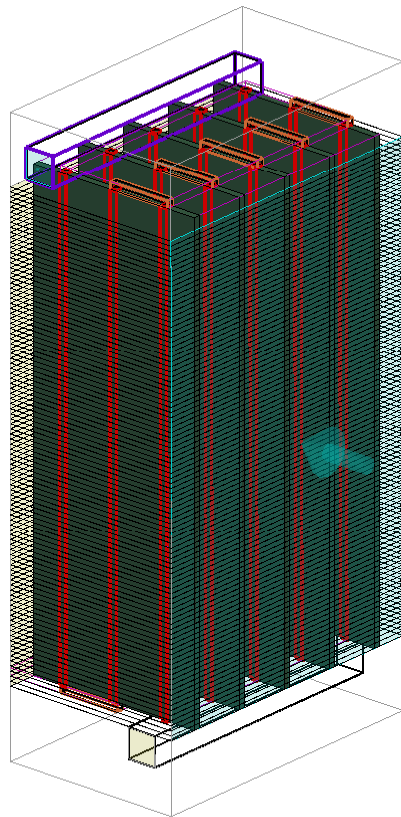
*Compliments of Applied thermal technologies



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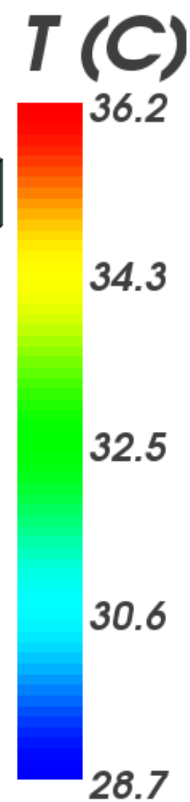
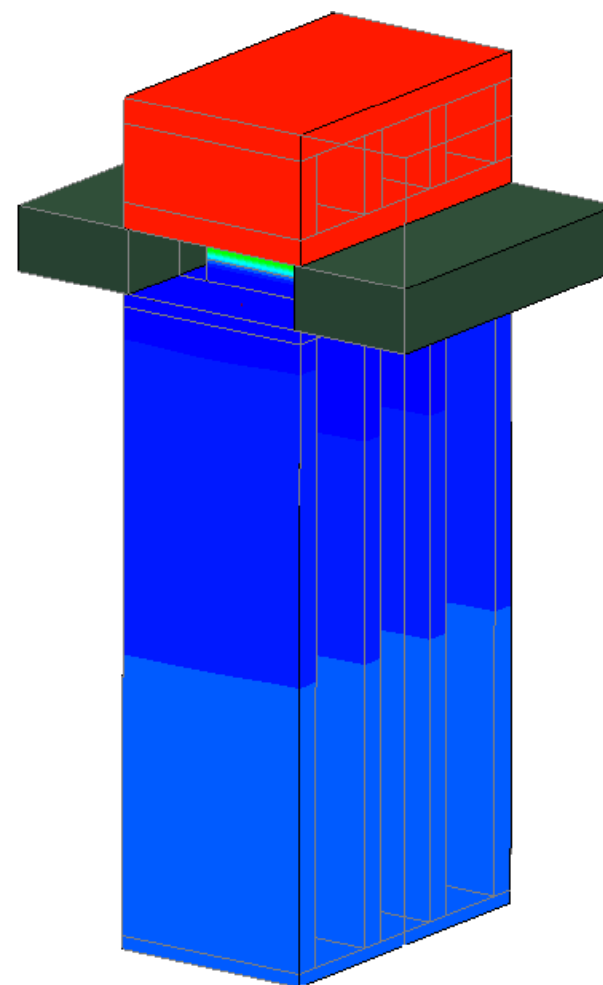
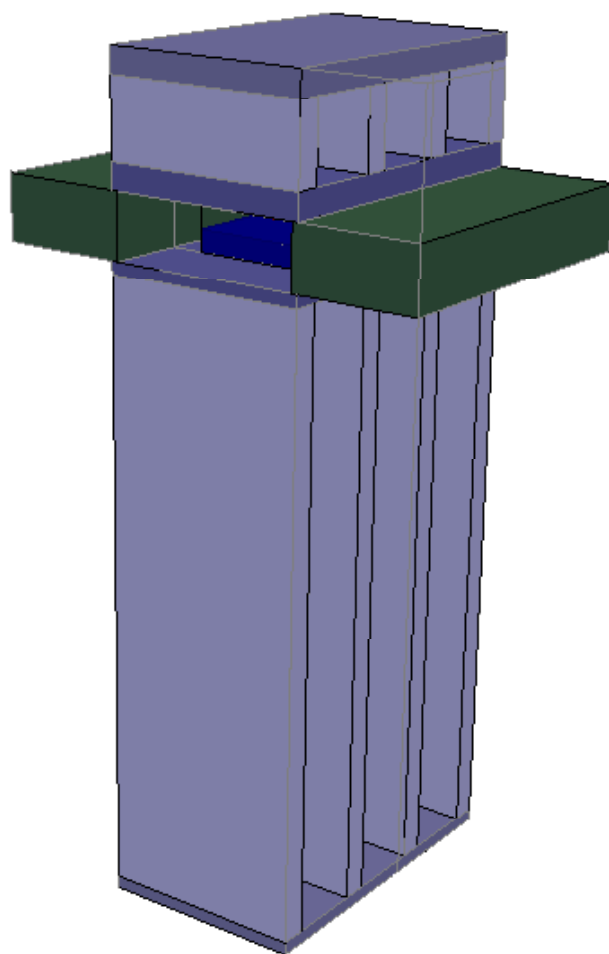
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Heat Exchanger:



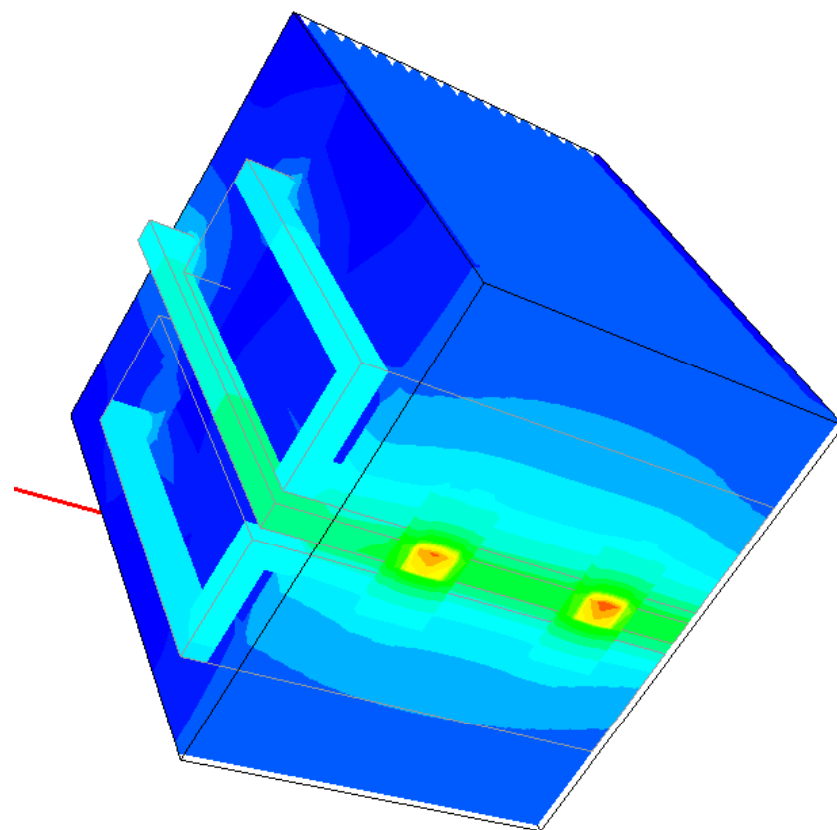
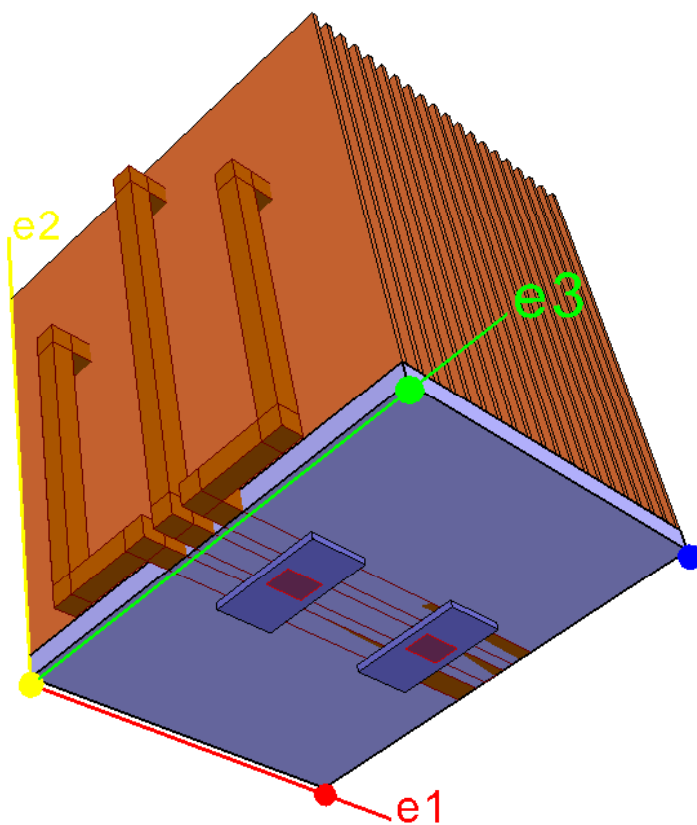
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TEC



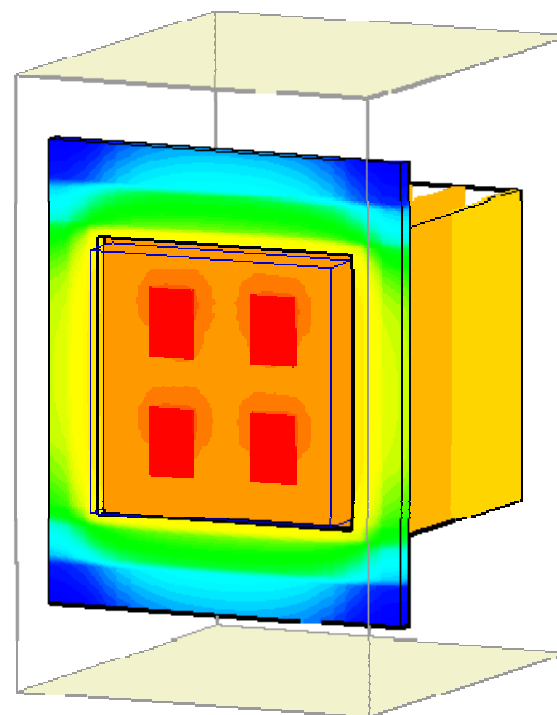
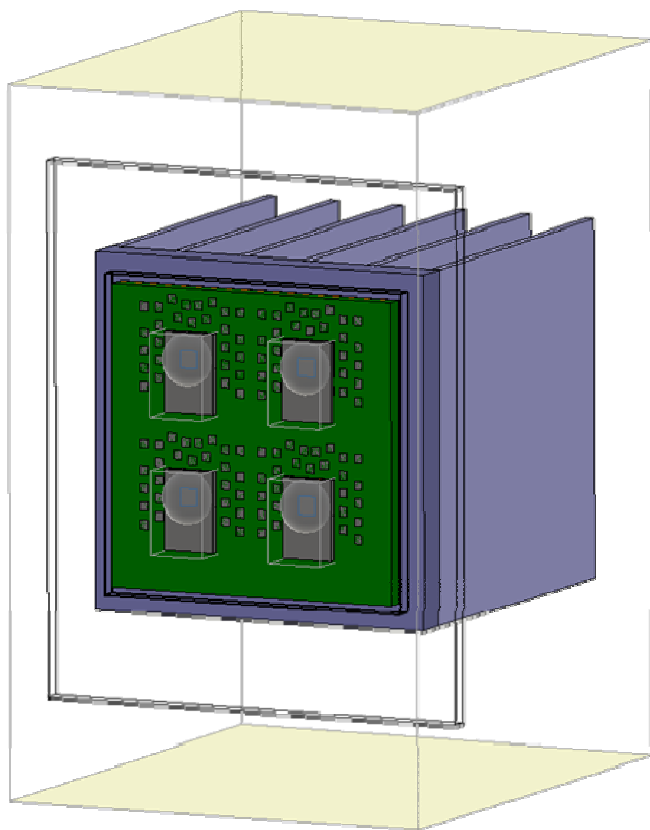
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Heat pipe



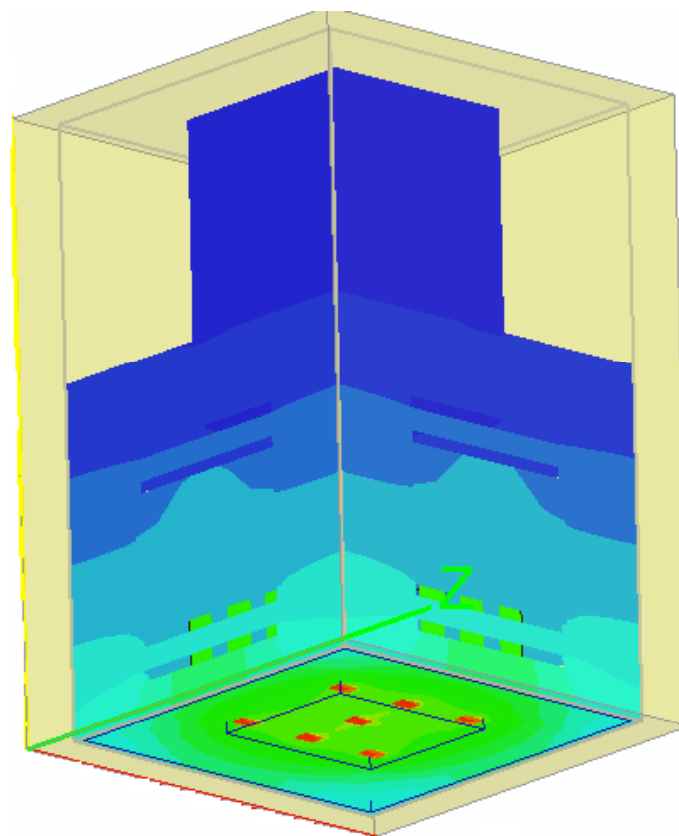
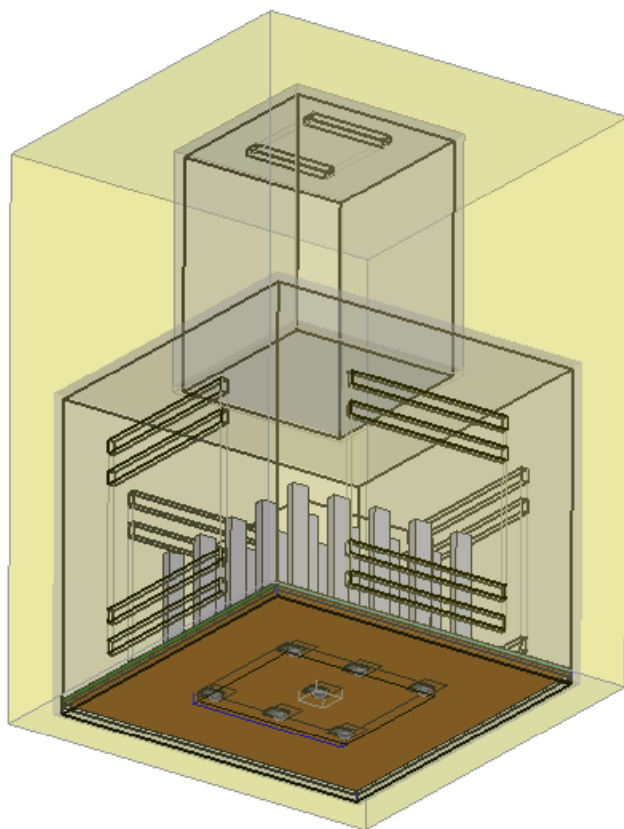
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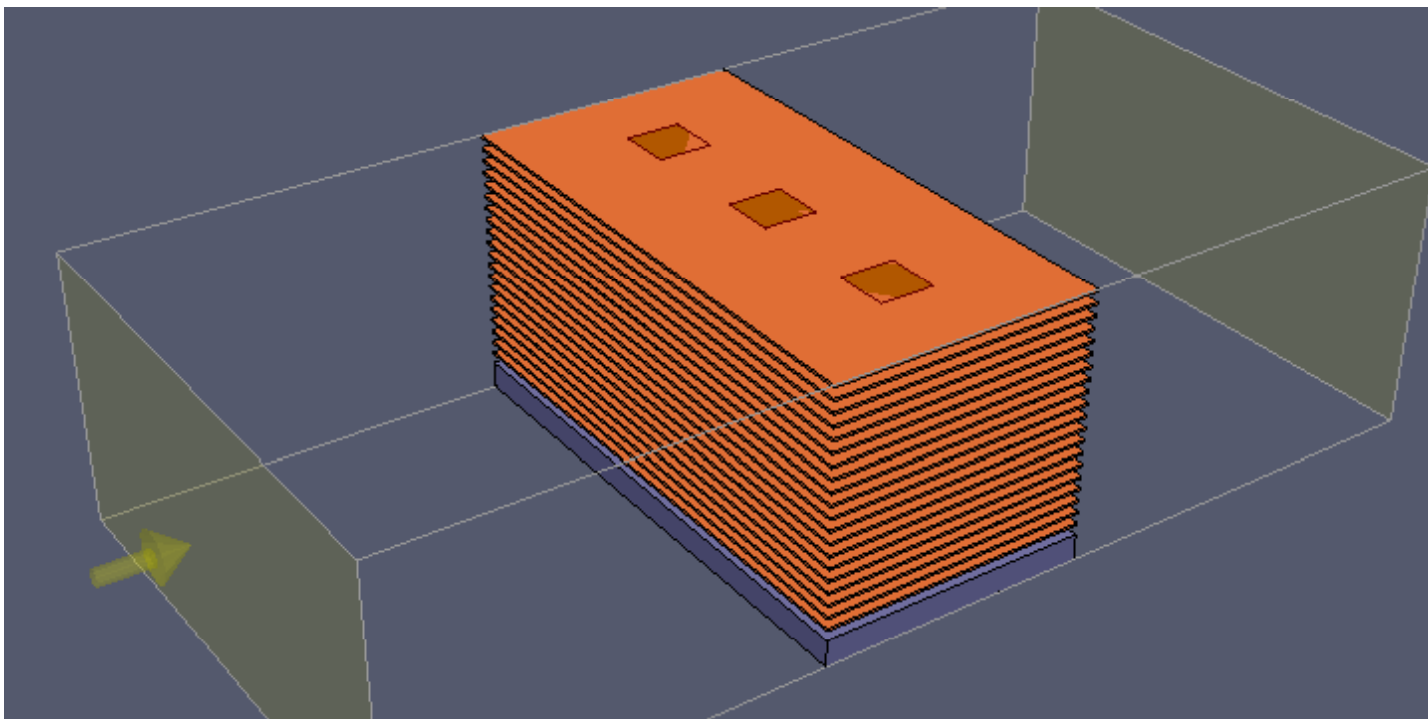
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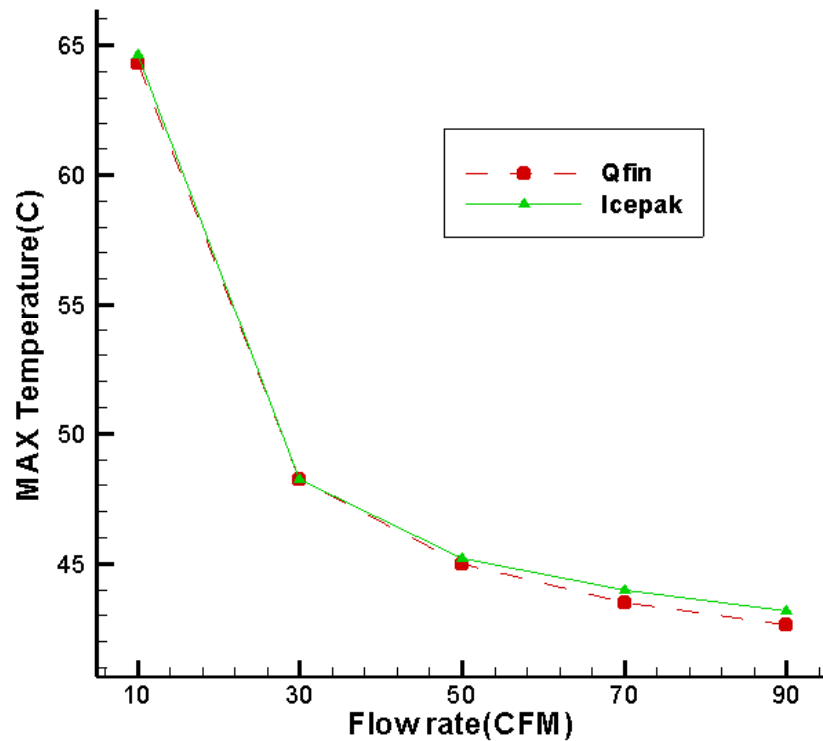
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模型如图所示，某热管散热器，热源热耗150w。
参数化进口空气的流量10、30、50、70、90CFM。



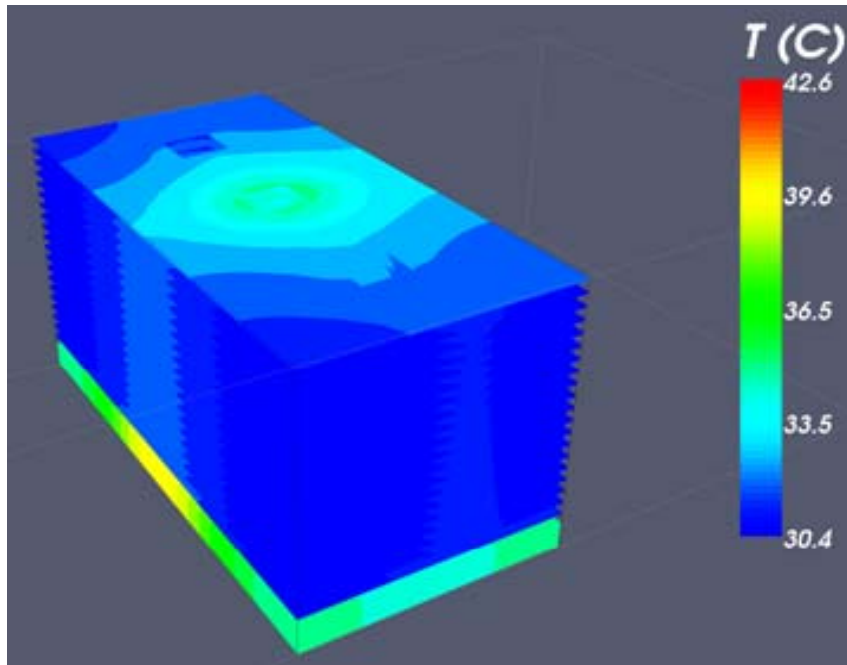


	Qfin (C)	Icepak (C)
10cfm	64.31	64.64
30cfm	48.24	48.24
50cfm	45.0	45.22
70cfm	43.52	43.95
90cfm	42.63	43.18

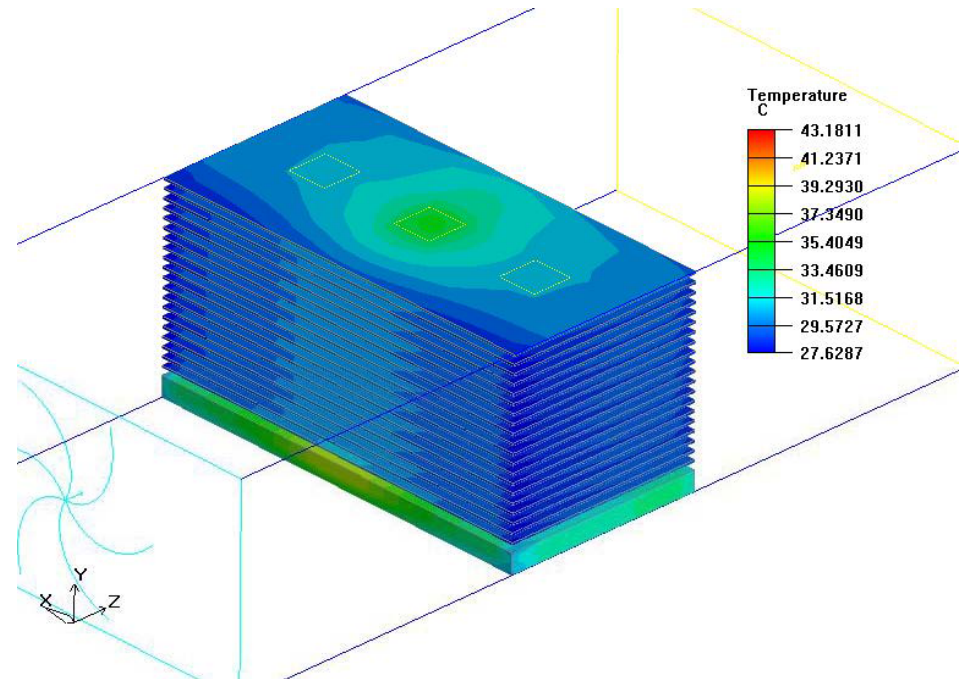


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Qfin.vs.Icepak

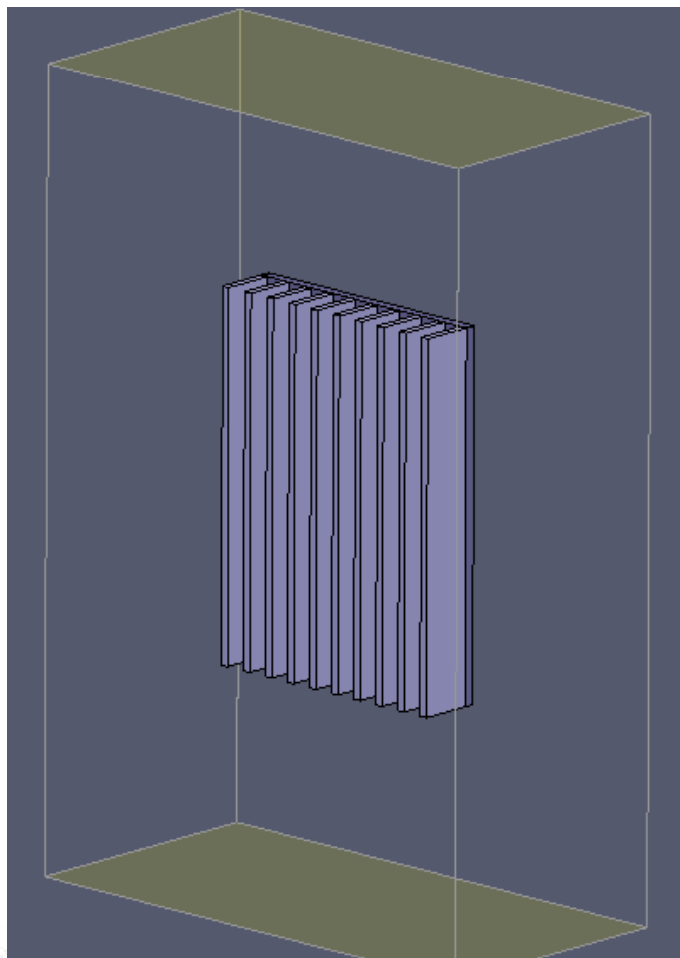


Qfin



Icepak





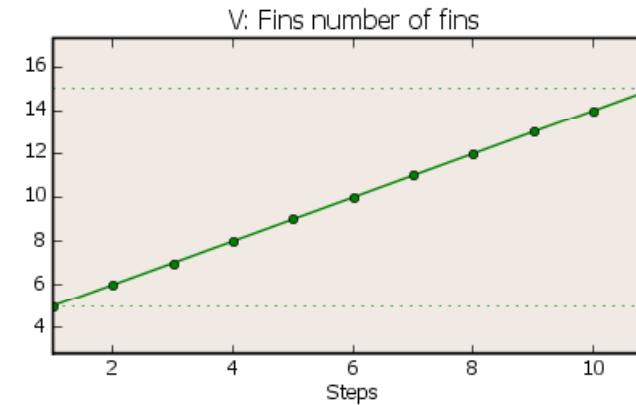
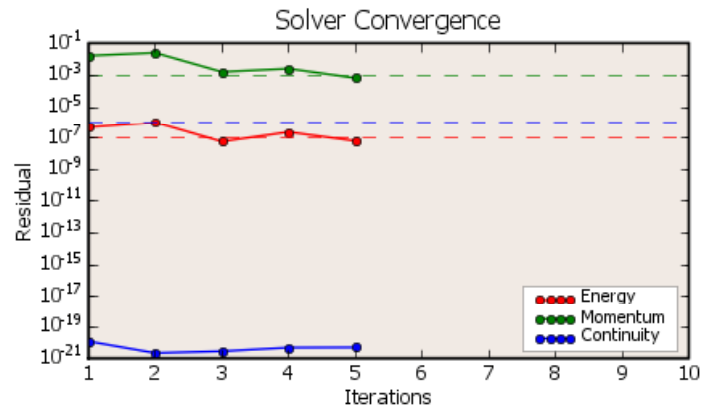
模型描述:

风道尺寸为**100*150*50mm**,
上下均为开口。

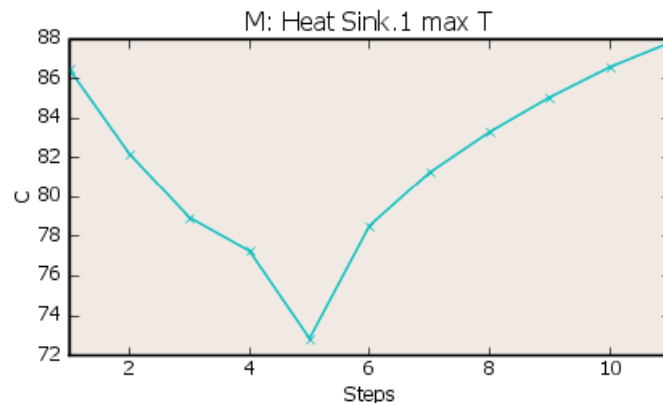
散热器基板尺寸为**50*2*70mm**,
翅片厚**1.5mm**, 高度为**10mm**, 翅
片个数为**10**。

热源尺寸**30*30mm**, 功耗为**10w**
。优化翅片的个数。





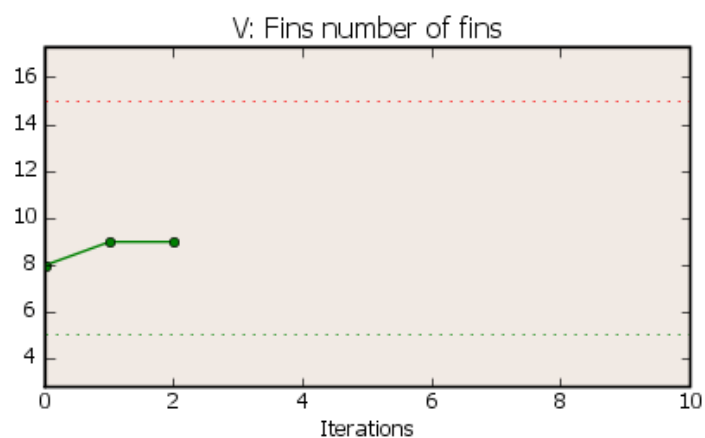
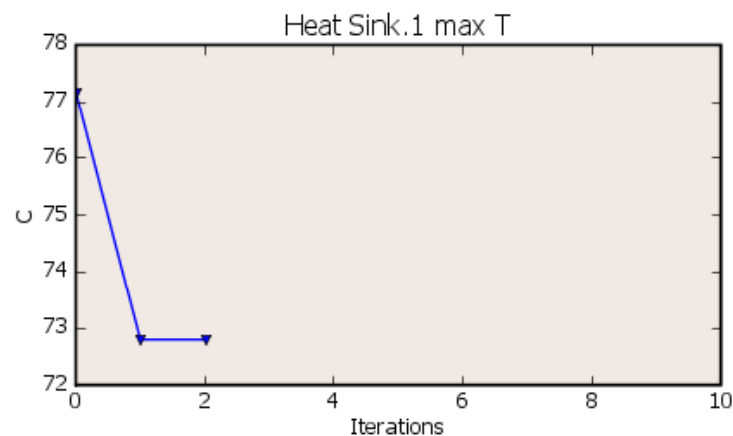
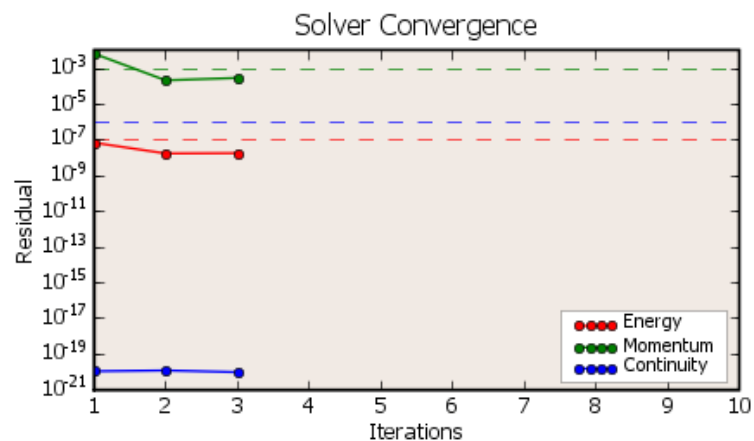
Heat Sink.1 max T



Trial Runs

Step	Fins number of fins	Heat Sink.1 max T
		C
1	5	86.47
2	6	82.21
3	7	78.96
4	8	77.27
5	9	72.86
6	10	78.55
7	11	81.26
8	12	83.32
9	13	85.06
10	14	86.59
11	15	87.82





Designs in Iteration Order

Iter	Rank	Heat Sink.1 max T	Fins number of fins
C			
0	3	77.17	8
1	1	72.80	9
2	2	72.80	9

Designs in Ranking Order

Rank	Iter	Heat Sink.1 max T	Fins number of fins
C			
1	1	72.80	9
2	2	72.80	9
3	0	77.17	8



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谢谢！

