广汽研究院 GAC ENGINEERING

ICSC 2017

CAE for virtual product
CAE for innovation
CAE for process transformation

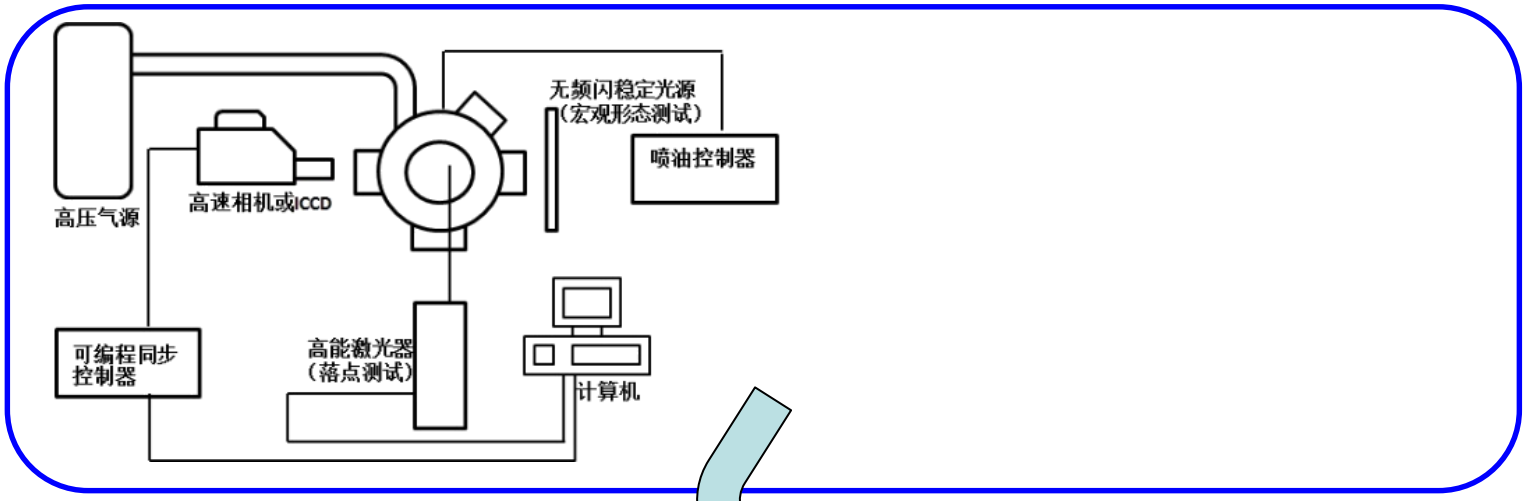
IDAJ CAE Solution Conference

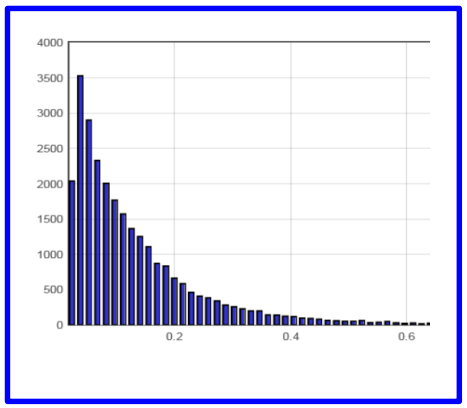
基于仿真计算和单缸机试验的直喷汽油机喷雾匹配设计及优化

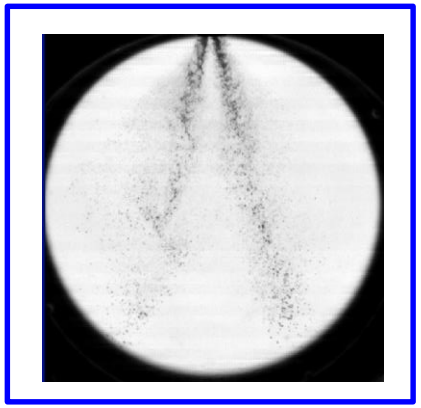
广汽研究院动力总成中心
武珊

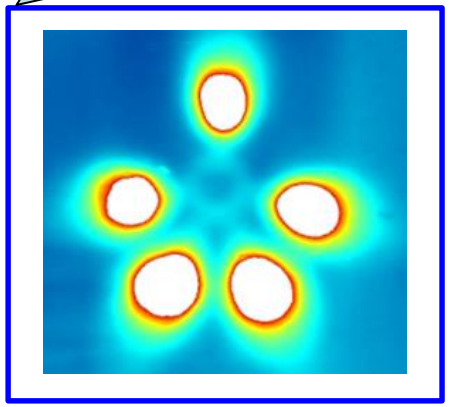
目录

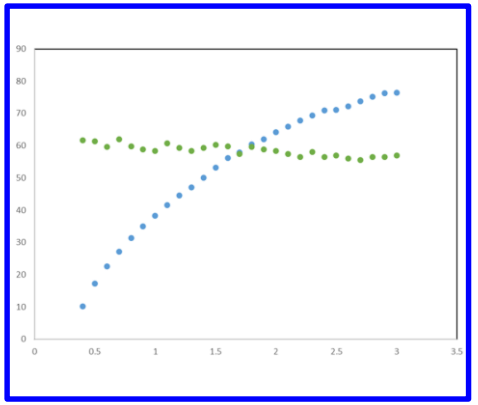
定容喷雾测试



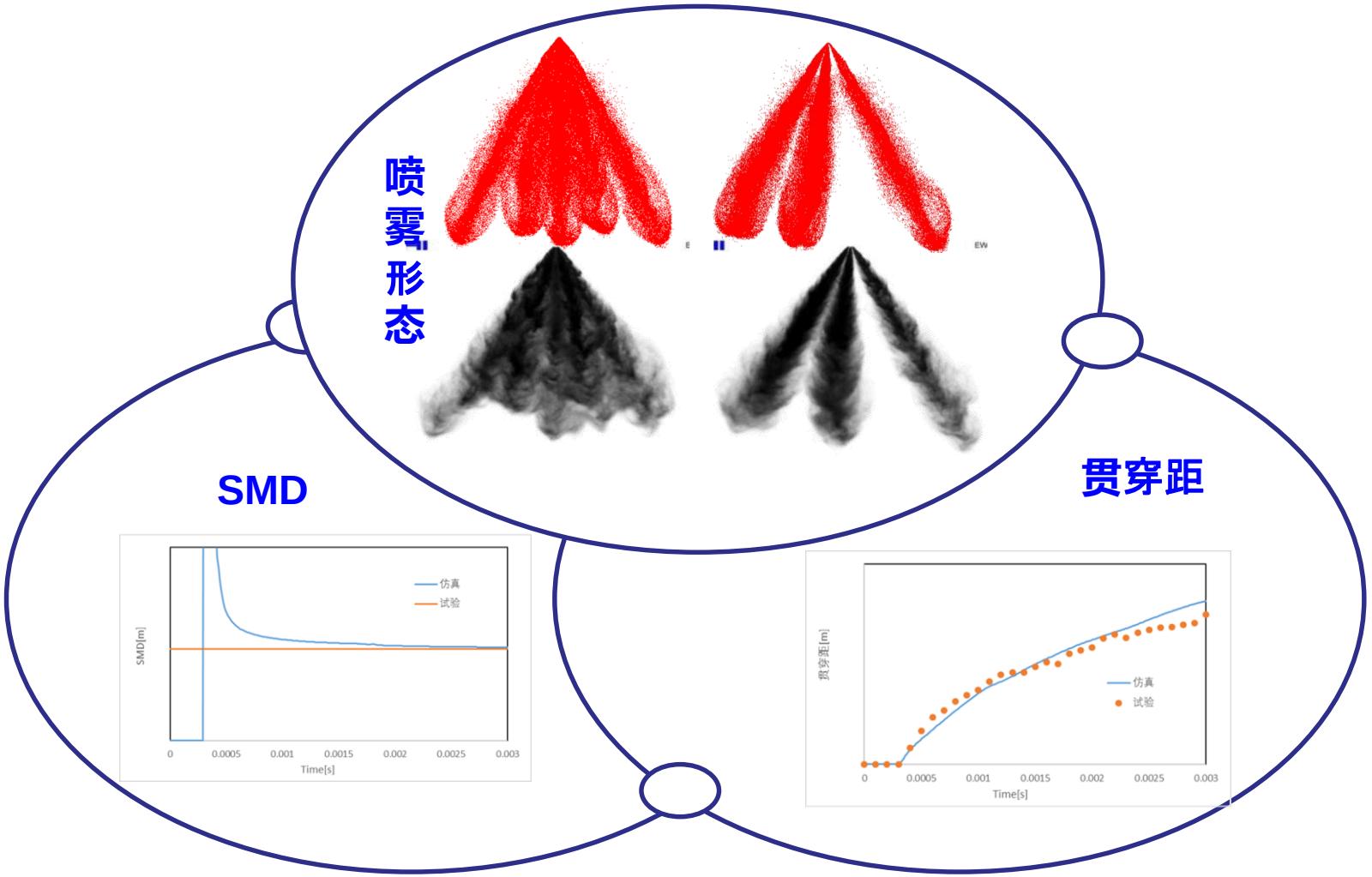




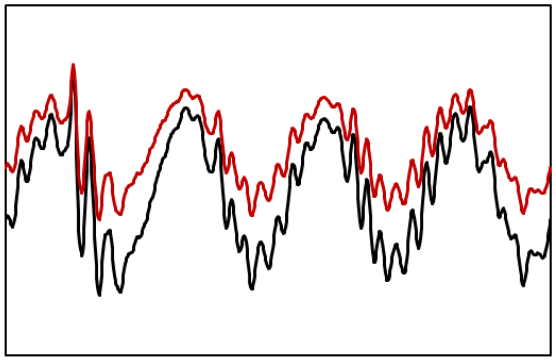


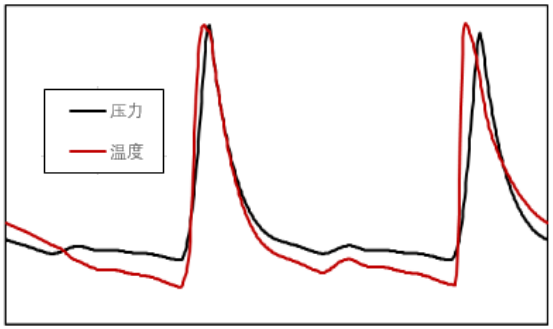


喷雾模型标定



缸内计算和分析

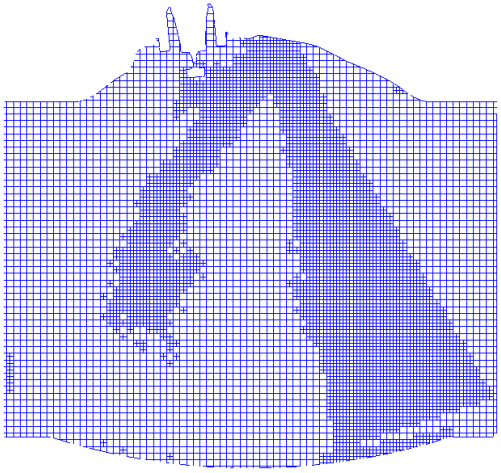


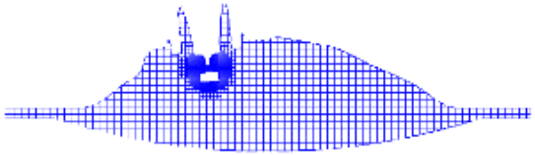


进排气边界条件

湍流模型	RNG k-ε RANS
壁面传热模型	O'Rourke and Amsden
液滴蒸发模型	Frossling model
喷雾破碎模型	KH-RT
燃烧模型	详细化学反应
数值算法	PISO

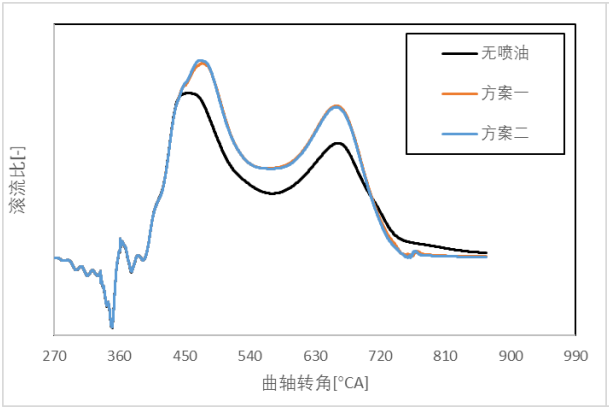
物理模型

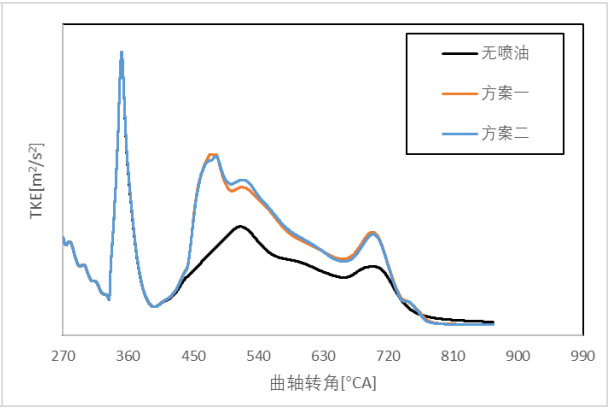


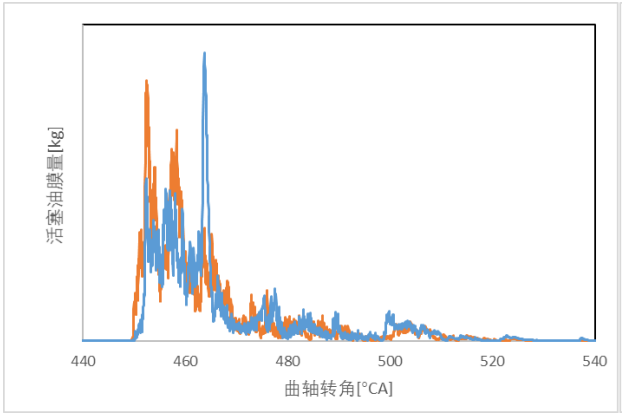


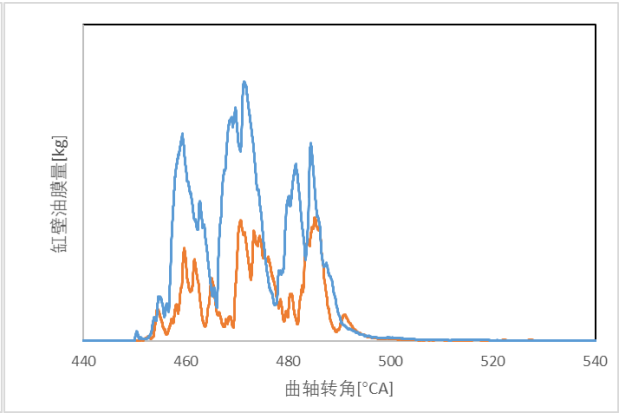
网格模型

缸内计算和分析



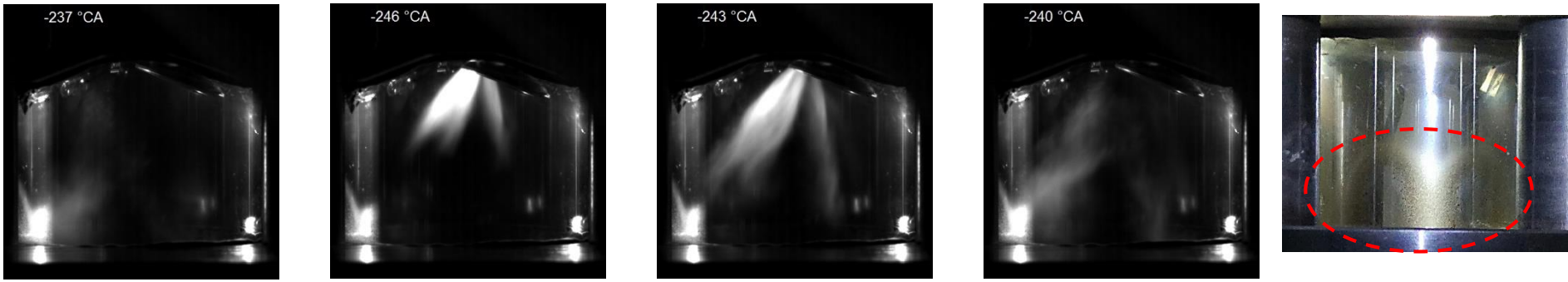




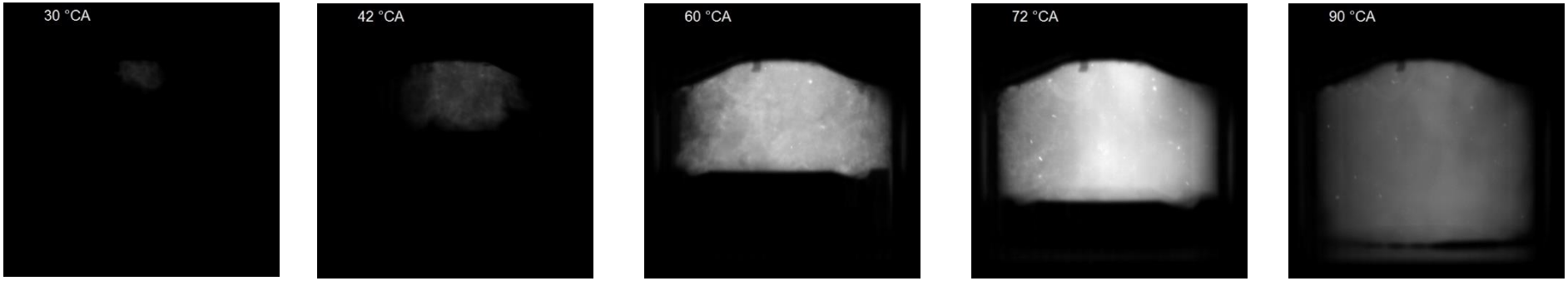


喷油加强缸内滚流比，提高缸内湍流运动；喷射和混合过程中缸壁油膜量显著。

单缸机试验

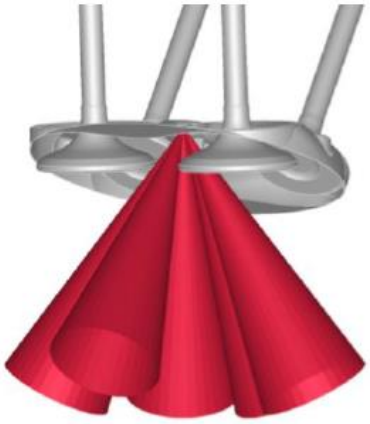


多次喷射后，缸套下方油膜逐渐累积，分析由于油束撞壁导致。

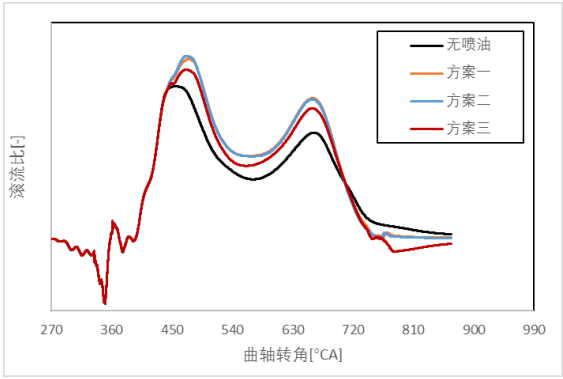


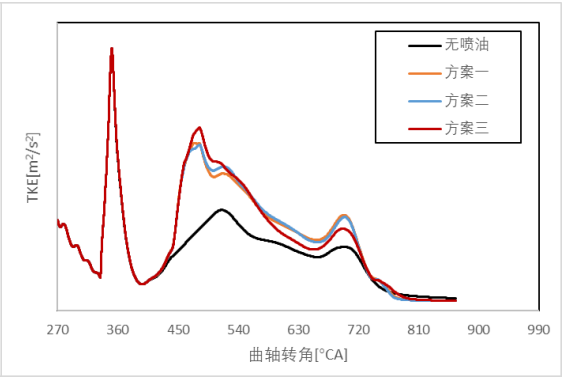
缸内燃烧过程主要为淡蓝色的预混合燃烧火焰。

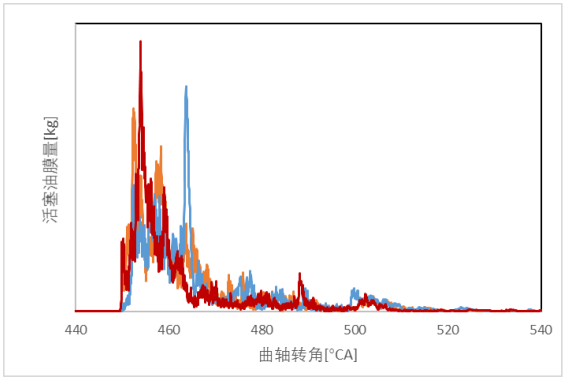
喷雾落点优化

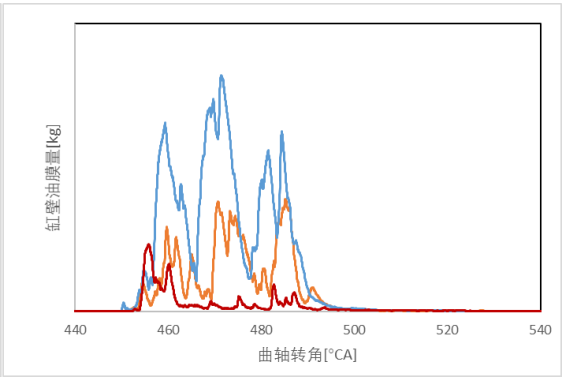


针对造成缸壁油膜的油束进行优化：调整油束角度和流量。缸壁油膜量显著下降，后续将进行单缸机和台架验证。









Thank You!

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