Next Phase in ASML's Digital Engineering: Modular-Swift-Precision Modelling

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Abstract

ASML designs and manufactures one of the most technologically advanced and complex machines humans have ever built. Developing such machinery needs an extreme collaboration between different clusters and disciplines. Parallel to this complexity, ASML's ambitions towards 2030 are high with faster development, integration and learning cycles. Customers are in need of better lithography and metrology machines in time that are reliable to keep up with world's hunger for more advanced chips on all fronts. This puts an extremely important role on ASML engineering to be more robust, connected and efficient within its product development cycle.

Digital Modelling has already been the engineering tooling since long years at ASML however when it is not interconnected, modular and fast it is only solving part of engineering problems at a limited scale and speed. In an era where time is as valuable as accuracy, Modular Swift-Precision Modelling emerges as a digital modelling approach, blending rapid computational speed with high-precision modelling. The keynote speech at the **euspen** Thermal Issues Group Meeting will introduce and explore the transformative capabilities of modelling in ASML's engineering domain.

Modular Swift-Precision Modelling represents a shift in engineering modelling. It integrates the comprehensive detail of high-fidelity engineering simulations with the agility of fast-system modelling, enabling engineers to achieve accurate results at speeds previously unimaginable. This talk will unveil the intricacies of the approach, emphasizing its potential to significantly shorten design cycles while enhancing the accuracy of predictions and analyses at higher level system scale.

Practical applications across some ASML use cases, specifically within thermal domain, including design, integration, validation and machine control will be highlighted. These case studies will demonstrate this method's claim for effectiveness in optimizing processes, improving system performances, and driving innovation at ASML.

The keynote will also delve into ecosystem of Modular Swift-Precision Modelling. We will discuss the evolving landscape, the ongoing advancements in computational technology, digital processes to keep up with the exploding variants and datasets and the skill sets necessary to leverage the approach effectively. The speech aims to inspire engineers, industry leaders and academic partners to embrace similar novel approaches in digital modelling.

Keywords: simulation, modelling, ROM, thermal, multiphysics, modular, swift, precision, system modelling, FEM, Finite Element method

Digital Assets:Reduced Order Models → Fast-Accurate multiphysics models
ROMs will follow the system decomposition & enable Digital Engineering usecases.