Integrated Modeling of Complex Optomechanical Systems II

Marco Riva
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Introduction

The importance of integrated modeling in optomechanical (also called STOP: **S**tructural **T**hermal **Op**tical) systems in design analysis has grown significantly over the last decades. This is mainly because of:

A. the increased complexity of the systems;
B. the necessity to determine early the performances of the systems in order to make budget evaluations and trade off selections; and
C. the difficulty of reproducing the operative conditions for the performance verification (space projects).

Space- and ground-based projects have different approaches and different practices.

Space projects need a detailed modeling almost from the very beginning of the project. During the development of the project itself (STM-EQM, etc.), the model is updated according to the test results in order to better predict the full performances and thus define compliances vs. requirements. As a result, the discrepancies diminish significantly throughout the development of the project. Such a procedure also helps in the modeling of future projects as it leads to the acquisition of a well-defined expertise.

The approach to ground-based projects has been slightly different up to now: the modeling contributes to the design and configuration of the system, but the test results rarely lead to the updating of the model in order to have better fidelity. It is important for all the scientists and engineers involved to understand the necessity to also fix the models of ground-based projects. Then the end-to-end models and calibration tools would be more efficient as well.

A fully detailed model is, itself, still not the complete answer. Starting with simplified models (i.e. equation-based) may require more work, but could help to better understand complex models. Complexity should be added step by step after validation and completion of previous milestones.

The aim of Integrated Modeling of Complex Optomechanical Systems II was to bring together people working in the ground- and space-based telescopes and instruments sectors to discuss ideas related to integrated modeling. Its focus was on the assessment of possible achievements obtained thanks to this approach in system engineering and design activities.

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The workshop allowed the participants to share their knowledge and its positive outcome highlighted the importance of involving a wider network of engineers in the discussion.

Marco Riva

Standing, from left:
- o   Phil Rees
- o   Michael Shanley
- o   Ronald Roelfsema
- o   Zhong Liu
- o   Carl Blaurock
- o   Igor Di Varano
- o   Jan Nijenhuis
- o   Davide Loreggia
- o   Jean-Christophe Salvignol
- o   Giorgio Pariani
- o   Matteo Genoni
- o   Martino Quintavalla
- o   Manuele Moschetti

Kneeling, from right:
- o   Marco Riva
- o   Alessio Zanutta
- o   Petra Dell'Arme
- o   Luca Oggioni
- o   Fabio Tenegi
- o   Johannes Störkle
- o   Shu Yuan