# Optimal control with targets optimized on the fly

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## Abstract

We discuss optimal control of interacting quantum systems with targets of control that are maximized by a manyfold of states. Such targets permit to seek *e.g.* the creation of well-defined entanglement properties without resorting to a specific state that realizes these properties. Omission of such a target state eases the identification of optimal control strategies significantly and permits to identify better solutions than possible with more restricted targets.

The prize for such targets is that they are typically defined in terms of an optimization itself. This results in the mutually dependent optimization problems of the identification of an optimal control sequence on the one hand and the assessment of the target on the other hand. We show how these optimizations can be solved efficiently and demonstrate how this framework permits to prepare many-body quantum states with desired properties with particularly robust coherence properties.

Figure 1: The conference logo.