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Project title	<b>High-intensity coherent nonlinear optics (HICONO)</b>
Title	<b>Fellow's report on activities : Workshop on "Control of Quantum Dynamics of Atoms, Molecules and Ensembles by Light" (June 2016, Nessebar/Bulgaria)</b>
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We attended the annual workshop on "Control of Quantum Dynamics of Atoms, Molecules and Ensembles by Light" ([CAMEL 12](#)), which offered scientific talks on issues relevant to our individual research projects in HICONO. The meeting brings together colleagues with background in quantum optics, coherent control, atomic physics, physical chemistry, and high-intensity, ultra-fast laser physics. The workshop was organized by Prof. N.V. Vitanov (Univ. Sofia), who is also member of the advisory board of external experts in HICONO. It was attended by members from several HICONO teams, as well as another member of the advisory board (Prof. S. Guerin, Univ. Bourgogne).

**Goal** : During the workshop we learned about a variety of important issues in coherent light-matter interactions, e.g. novel concepts to efficiently and robustly control quantum systems, or about new experimental developments to enhance harmonic generation.

**Impact** : We note, that the workshop is rather focussed and small (i.e., with roughly 50 attendees) compared to big conferences. However, it provides an audience with many of the main actors on the previously mentioned fields of research. An audience of colleagues from all around Europe and the United Kingdom to which disseminate our research and progress on the lines of the HICONO project.

**Methodology** : Both of us gave oral presentations for the scientific community at CAMEL : K. Zlatanov talked about generation of coherent superposition states, with potential applications to support nonlinear-optical frequency conversion at moderate intensities and harmonic order, e.g. in third-harmonic generation.



X. Laforgue talked about single shot shaped pulses (SSSPs), i.e. specific coherent-adiabatic light-matter interactions to manipulate quantum systems. While SSSPs were initially meant for applications in quantum optics, they can also be used to drive coherent superpositions in atomic gases and enhance frequency conversion efficiencies therein. These issues were extensively discussed during the meeting.



The size of the workshop and varied backgrounds of the attendees enabled young researchers to have ample opportunities for lively and extended discussions with all other participants and speakers.