

Making light jump

Photonic crystals on trampoline membranes for optomechanics experiments

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Propositions

accompanying the dissertation

MAKING LIGHT JUMP

PHOTONIC CRYSTALS ON TRAMPOLINE MEMBRANES FOR OPTOMECHANICS EXPERIMENTS

by

João Pedro PINTO MOURA

1. Stress engineering remains the most practical way of increasing the quality factor of a mechanical resonator's fundamental mode. *This proposition pertains to this dissertation.*
2. Despite their limited usefulness, relying on simulations of a single plane wave incident on a small photonic crystal slab is ultimately unrealistic. *This proposition pertains to this dissertation.*
3. Optomechanical arrays with stacks of photonic crystal slabs are one of the most promising paths towards strong single photon–phonon coupling. *This proposition pertains to this dissertation.*
4. It is still not known how the mechanical modes of optomechanical arrays couple to each other. *This proposition pertains to this dissertation.*
5. The experimental intricacies of complex experiments should be given more relevance and appreciation.
6. Due to the growing complexity of their projects, PhD students would benefit from less individual and more team work.
7. Skilled technicians are crucial for successfully and efficiently run experiments; however, universities often undervalue their work or have too few of them.
8. Proper communication increases the relevance and impact of one's work. However, researchers should refrain from turning science into a marketing competition.
9. Given that a country's fertility rate is anticorrelated with its income and that the economy of developing countries is expected to strongly and continuously grow in the foreseeable future, overpopulation might be an overestimated problem.
10. Strong, globalized trade relationships are one of the main factors for the world's growing peace and prosperity.

These propositions are regarded as opposable and defensible, and have been approved as such by the promoters prof. dr. H.S.J. van der Zant and dr. S. Gröblacher.