

## PhD and Postdoc positions: Interacting photons in cavity arrays

<b>Research / Job description</b>	<p>In this project you will couple tunable optical microcavities with nanostructured excitonic materials to achieve strong photon-photon interactions. You will use these interactions to investigate phase transitions of light, and to evidence the conditions under which noise can enhance the transport of excitations in complex systems. By designing cavity arrays with different dimensionalities and geometries, you will tailor the potential landscape in which photons hop and interact. This will allow you to emulate the behaviour of condensed matter systems with light.</p> <p>You will be primarily involved in all aspects of the design, realization, and analysis of experiments. In synergy with another group member and the group leader, you will build two optical setups:</p> <p>i) a tunable cavity system that can be moved to other labs at AMOLF. This will allow you to probe the nonlinear optical response of hybrid light-matter states using ultrafast lasers. Here the aim is to investigate the physics of quantum fluids of light (e.g. a superfluid) at room-temperature.</p> <p>ii) a low-temperature tunable cavity system suitable for nonlinear and quantum optical experiments. Here the aim is to investigate non-equilibrium phase transitions by measuring the nonlinear dynamics of single and coupled microcavities under the influence of quantum fluctuations. You will control the strength of the photon-photon interactions via the tunable cavity, and the influence of the quantum fluctuations by tuning the frequency of the driving laser.</p> <p>Through these projects you will become an expert in hybrid light-matter systems, nonlinear optics, quantum optics, and condensed matter physics. You will collaborate with other AMOLF groups synthesizing organic and inorganic materials that you will place inside microcavities, and with colleagues at the University of Oxford in the design of novel microcavity arrays. You will also develop theory, and work closely with theoretical groups, to interpret your experimental results.</p>
<b>About the group</b>	<p>The Interacting Photons group is part of the Center for Nanophotonics at <a href="#">AMOLF</a>. Our activities officially start on November 1, 2017, but we are already preparing our labs for “hitting the ground running”. We are interested in the fundamental physics, but we also value applications. We have strong connections to other groups in the Netherlands, in</p>

	France, and in the UK. You will have extensive support from the group leader and the technical staff at AMOLF. You will have access to state-of-the-art nanofabrication and characterization methods at the Amsterdam NanoLab. In collaboration with other AMOLF groups you will have access to setups with a wide range of capabilities.
<b>Required qualifications</b>	For the PhD: You have (or will get soon) a MSc in Physics or closely-related discipline. Lab experience in optics/ photonics is preferable, but not strictly necessary. For the Postdoc: You have (or will get soon) a PhD in Physics or closely-related discipline. Lab experience in optics/ photonics is required. For PhD and postdoc: A background or strong interest in any of the following is valued: nonlinearity, quantum optics, coupled systems, condensed matter, stochastic systems. This project involves multiple collaborations, so we are looking for a team-player.
<b>Terms of employment</b>	The position is intended as full-time (40 hours / week, 12 months / year) appointment in the Netherlands Foundation of Scientific Research Institutes ( <a href="#">NWO-I</a> ) for the duration of 4 years in the case of a PhD. For a postdoc, the intended duration is 2 years, with possibility to extend an extra year upon satisfactory performance. AMOLF assists any new PhD or postdoc with housing and visa applications and compensates their transport costs.
<b>For further information please contact</b>	Dr. Said R. K. Rodriguez Group leader Interacting Photons E-mail: <a href="mailto:srodriguez@amolf.nl">srodriguez@amolf.nl</a> Phone: +31 (0)20-754 7100
<b>Application</b>	You can respond to this vacancy online via the AMOLF website. Please annex your: - Resume; - Motivation on why you want to join the group (max. 1 page). Applications without this motivation will not be taken into account. However, with this motivation your application will receive our full attention.

