



复旦大学物理系

Special Colloquium & Friday Theory

Time: 9:30 am, Friday, 2021.04.16

Location: Room C101 (视频会议室), Jiangwan Physics Building

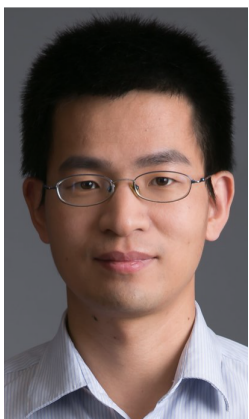
Host: Xiaopeng Li

Photonic quantum computational advantage

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Abstract: The main challenge for scaling up photonic quantum technologies is the lack of perfect quantum light sources. We have pushed the parametric down-conversion to its physical limit and produce two-photon source with simultaneously a collection efficiency of 97% and an indistinguishability of 96% between independent photons. Using a single quantum dot in microcavities, we have produced on-demand single photons with high purity (>99%), near-unity indistinguishability, and high extraction efficiency—all combined in a single device compatibly and simultaneously. Based on the high-performance quantum light sources, we have implemented boson sampling—which is an intermediate model of quantum computing, a strong candidate for demonstrating quantum computational advantage and refuting Extended Church Turing Thesis—with up to 76 photon clicks after a 100-mode interferometer. The photonic quantum computer, Jiuzhang, yields an output state space dimension of 10^{30} and a sampling rate that is 10^{14} faster using the state-of-the-art simulation strategy on supercomputers.



主讲人简介: 陆朝阳，剑桥大学博士，中国科学技术大学教授。长期致力于量子物理和量子计算的研究，取得了包括研制光量子计算原型机在内的一系列具有国际影响力的研究成果。发表学术论文100余篇，被引用13000余次。研究成果入选英国物理学会评选的国际物理学年度突破榜首，六次入选两院院士评选的年度中国科技十大进展新闻。曾获国家自然科学基金一等奖、中国青年五四奖章、首届科学探索奖、中国物理学会黄昆半导体物理奖、香港求是杰出青年学者奖、日本仁科芳雄亚洲奖、《自然》“中国科学之星”、欧洲物理学会菲涅尔奖、IUPAP光学领域青年科学家奖、美国光学学会阿道夫隆奖章、美国物理学会量子计算奖、全球高被引学者。担任2020国际量子大会主席、九三学社中央青工委副主任、全国青联常委、中国科学院《科学通报》副主编，以及多个国际期刊的编委。