李博士是一位具有丰富国际合作经验的具有独立科研能力的博士后研究员，专注于人工智能（AI）原生的 6G 无线通信网络、智慧物联网（无人系统、智慧家居、智慧城市、智慧农业、智能物流等）、基于无人机的非地面通信（低空经济和空天地海一体化通信关键支撑）、用于多接入边缘计算（MEC）的（可扩展/多智能体）深度强化学习（DRL）赋能的无线和计算资源一体分配一体管理、超大规模天线阵列（UM-MIMO）太赫兹（THz）通信系统的（量子）机器学习（ML）辅助和/或压缩感知（CS）支持的信道估计、物理层安全以及隐蔽通信等领域 [1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 10, 3, 2, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21]。

李博士在顶级期刊 [7, 1, 2] 和旗舰会议 [6, 8, 10, 3] 上发表了多篇关于量子计算和/或（多智能体）DRL 辅助未来无线通信智能决策的论文，例如无人机辅助传输网络和多接入边缘计算。目前，他正积极投身于这一融合量子机器学习与下一代无线网络的跨学科研究领域。

在伦敦国王学院攻读博士期间，李博士为无人机辅助无线网络设计了首批量子辅助 DRL 算法 [1, 2, 3]，通过量子力学的增强重新定义了传统的 DRL 框架。在之前的工作中 [1, 2, 3]，他提出了开创性的量子启发式 DRL 框架，从智能体的动作选择策略和经验回放策略出发，提升传统 DRL 算法（如深度 Q 网络及其变体）的训练性能，实现无缝的无线传输。

具体来说，李博士引入了新的概率动作选择策略和强化策略，分别受到量子力学中的坍缩现象和振幅放大的启发。此外，为了帮助 DRL 智能体在采样优先级和多样性之间取得更佳平衡，他提出了有前景的量子启发式经验回放（QiER）框架，将经验转移的时序差分（TD）误差与配对的量子比特（qubit）相关联，采用基于格罗弗迭代的量子振幅操纵。

他的专业领域还扩展至贝叶斯学习 [4]、联邦学习和多智能体 DRL[5, 6]。在南洋理工大学担任研究员期间，李博士专注于为 UM-MIMO THz 传输系统提出 CS 辅助和/或（量子）ML 支持的信道估计算法，考虑了信道的稀疏性和近场辐射特性 [4]。

除了（量子）ML 辅助的性能优化外，李博士还是设计安全和隐蔽感知无线传输协议的专家 [9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21]。他深入分析了各种无线传输协议的性能，推导出关键指标的闭式表达式和上/下界，评估了设计参数对无线传输性能的影响，揭示了系统参数之间的内在权衡，为无线系统设计提供了指导。

李博士在 DRL、无线系统和量子辅助 ML 方面拥有独特的专业知识，在这些领域发表了 20 多篇论文 [1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 10, 3, 2, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21]，其中大部分发表在 IEEE 无线通信汇刊和 IEEE 国际通信会议等顶级期刊和会议上。李博士的卓越成果使他能够设计、分析和优化量子增强的智能 6G 无线系统，开创了量子计算、ML 和无线通信融合的全新跨学科研究领域。

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