

人物风采

郑婉华院士

1 主要经历

郑婉华，1966 年 2 月出生，1988 年于山东大学光学系激光专业获学士学位，1991 年于中国科学院物理研究所光物理实验室获硕士学位，同年进入中国科学院半导体研究所工作，1998 年于香港浸会大学理学院获理学博士学位。曾先后在澳大利亚新南威尔士大学光电子实验室、日本横滨大学微纳光电子学实验室、美国麻省理工学院光子晶体实验室、香港浸会大学材料中心等进行纳米材料、光子晶体材料与器件的研究。2003 至 2005 年担任中国科学院半导体研究所研究员，2010 年获得国家杰出青年科学基金，2013 年开始享受国务院政府特殊津贴，2014 年入选国家百千万人才工程，同年被授予“有突出贡献中青年专家”荣誉称号，2015 年被聘为国家外国专家局重点引智项目评审专家，2012 和 2017 年两次成为科技部重点专项首席科学家，2019 年入选山东省泰山学者特聘专家，2021 年被遴选为中国科学院院士。现任中国科学院固态光电信息技术创新重点实验室主任、中国科学院半导体研究所学术委员会和学位委员会成员、潍坊先进光电芯片研究院院长。

郑婉华研究员发表 SCI 论文 100 余篇，授权专利 50 多项，2013 年获北京市科学技术二等奖，2014 年获中国光学重要成果奖，2017 年获中国光学工程学会科技创新奖一等奖，同年获国家技术发明奖二等奖，2018 年获中国专利金奖，2020 年获部委科学技术进步奖一等奖。

2 主要成就

郑婉华研究员长期从事半导体人工微结构材料与器件的研究。在硅基光子晶体和激光产生研究方面，采用硅基纳米结构材料，实现高 Q 值的光子晶体微腔，首次在国际上采用硅基光子晶体宽带隙材料，实现可见光的锁模脉冲激光，上述工作作为前沿技术进展分别被 *Laser Focus World, Photonics* 等杂志报道；在 III-V 族半导体人工微结构材料与器件的研究方面，在国内首次实现 InP, GaAs 基光子晶体面发射、边发射激光器的突破；在光子集成新技术方面，研制出国内首台具有自主知识产权的晶片键合、清洗系统；利用联合调控光子态和电子态获得高性能激光输出取得了系统的创新性成果，低发散角光子晶体激光技术成功进行技术转移；将宇称时间对称性、超对称等凝聚态物理概念引入到边发



中国科学院院士
郑婉华

射半导体激光器中，改善了半导体激光器模式特性，并在国际上首次实现了电注入的超对称半导体激光器。

代表性论文著作

- 1 Zhang J, Hao C, Zheng W H, et al. Demonstration of electrically injected vertical-cavity surface-emitting lasers with post-supported high-contrast gratings. *Photonics Res*, 2022, 10: 1170–1176
- 2 Xu C, Qi A, Wang T, et al. Narrow vertical divergence 780 nm lasers with modulated refractive index of photonic crystal structure. *Appl Phys Express*, 2022, 15: 044002
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- 17 周旭彦, 赵少宇, 马晓龙, 等. 低垂直发散角高亮度光子晶体半导体激光器. *中国激光*, 2017, 44: 0201010
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