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凝聚态物理-北京大学论坛

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Engineering Ferroelectric Domain for Nonlinear Photonics Laser and Quantum Optics

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时间：5月14日（星期四）15:00－16:40

地点：北京大学物理大楼中212教室

祝世宁，获南京大学物理系硕士、博士学位。1996年至1998年在美国宾州州立大学从事访问研究。1999年至2005年任南京大学固体微结构物理国家重点实验室副主任，凝聚态学科主任，现任南京大学物理学系主任，教授，博士生导师，中科院院士。
从事凝聚态物理与光学研究。曾在包括美国《科学》、《物理评论快报》，英国《自然.材料》等在内的国际学术刊物上发表高水平论文百余篇，授权与申请国际、国内发明专利二十余项。合作研究成果二次获中国基础研究年度十大新闻，二次被评为中国高校年度科技十大进展。曾获南京大学杰出贡献奖和"863"计划十五周年先进个人(重要贡献)、香港"求是"基金会杰出青年学者、第五届南京市科技之星、江苏省高校科技先进个人等称号，他与合作者完成的"介电体超晶格的设计、制备、性能与应用"荣获2006年中国国家自然科学一等奖。

Abstract: For the recent two decades, spurred by the success of the semiconductor superlattice and quasi-phase-matching (QPM) technique, engineering domain has become a hot topic in condensed matter physicsand photoelectronics. The domain-engineered ferroelectric crystal is a single crystal in which the ferroelectric domain is modulated artificially according to some sequence, forming so-called superlattice structure. The physical properties associated with third-rank tensors like nonlinear susceptibility tensor $\chi(2)$ in such a crystal are modulated with domains, whereas those associated with even-rank tensors remain constants. This makes the crystal different from a homogeneous single domain one, and specially favorable for applications in nonlinear photonics. In the case that the wavelength of light wave is comparable with or smaller than the size of domain, that is, the reciprocal vector of the modulated structure is comparable or larger than the wave vector of light wave, many fancy physical effects may create through the interaction of the wave vectors and the reciprocal vectors of superlattice. For example, the enhancement of optical frequency conversion, the amplification of light scattering signal, the generation of entangled photon pair and polariton excitation *etc*. The interests in engineering domain structure of ferroelectric crystal lie not only in its fundamental research but also in practical applications. Many of them have been put to use in novel devices matched with contemporary nonlinear photonics, laser and quantum optics.

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Photograph by Xiaodong Hu