介观光学及局域场调控理论研究报告

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摘 要:该年度的研究工作围绕金属微纳结构微观动力学模型以及相关的电磁场理论进行,分析了金属微纳结构场增强、透射增强、吸收增强等的物理机制,给出了金属微纳结构中若干电磁模式及其散射系数的性质,开展了表面等离激元和量子体系的耦合及其表面等离激元波导的研究。

关键词:金属微纳结构 微观动力学模型 场增强 透射增强 吸收增强 量子体系 表面等离激元波导

Annual Report of the Project "Theoretical Investigation of Mesoscopic Optics and Localized Field Modulation"

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Abstract:The research work of this year is focused on the microscopic dynamics model of metallic micro/nano-structures and the related theories of electromagnetic fields. The physical mechanism of the field enhancement, transmission enhancement and absorption enhancement of metallic micro/nano-structures is analyzed. The properties of some electromagnetic modes and of their scattering coefficients in metallic micro/nano-structures are provided. The coupling between the surface plasmon polariton and quantum systems is investigated and the waveguides of surface plasmon polaritons are studied.

Key Words:Metallic micro/nano-structures; Microscopic dynamics model; Field enhancement; Transmission enhancement; Absorption enhancement; Quantum system; Waveguide of surface plasmon polaritons

阅读全文链接(需实名注册):http://www.nstrs.cn/xiangxiBG.aspx?id=50307&flag=1

社交网络群体行为与群体情感理论研究年度报告

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摘 要:该研究围绕社交网络的"群体行为形成与互动规律"这一科学问题,重点研究社交网络群体行为与群体情感理论。在2013年度中,主要进行了如下4个方面研究:在社交网络群体聚集机理及建模方法方面,针对群体聚集的诱因分析,从微博话题聚类、广告用户检测、不良节点挖掘等方面进行了研究。针对群体聚集模型和凝聚力算法,从复杂社团分聚类算法、微博僵尸群检测等方面进行了研究。针对群体行为属性和共性需求机理,研究了群体隐私保护的共性需求和防护机制、策略描述及合成等问题;在社交网络群体演化动力学行为方面,对群体行为演化模型及干预研究了微博信息传播预警问题。在多维属性的群体情感建模方法方面,从社交网络用户的个体人格结构、心理因素和经历背景等要素与其行为特征、情感立场的关系,研究了个体的多属性、多维度统计特性。在基于群体情感形成机理研究情感演化计算方法,开展了群体情感立场的量化、群体情感发现、基于异质网络分析的个体行为信息的多属性挖掘等方面的研究。基于以上研究要点,已发表研究论文28篇,其中SCI论文7篇,EI论文15篇。出版专著1部。申请发明专利4项,授权1项。

关键词:群体行为 群体情感 重叠社区

Research Progress in 2013 of Research on Group Behaviors and Group Emotions in Online Social Networks

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Abstract:In this project, focusing on the scientific problem of group behavior formation and interactive principles, we study the group behavior and group emotion theory in the online social networks. In the year 2013, the project team developed the research mainly on four aspects. On the group aggregation principles and modeling methods aspect, aiming at incentive factors of group aggregation, we studied the topic aggregation in Weibo, detection of advertising users, and malicious user mining in SN. Aiming at group behavior attributes and common security requirements, we studied the group privacy protection policies and mechanisms. On the aspect of group behavior evolution, we studied the communication alert problem in the Weibo. On the multi-dimension attributes based emotion aspect, we studied multi-attributes and multi-dimension statistics characteristics of individual emotions from the relationship of individual personality, mentality, and background. On the group emotion formation principle base group emotion evolution calculation aspect, we studied the quantization of group emotion position, discovery of group emotion, multi-attributes mining of individual behavior information based on heterogeneous networks. Based on the research on the above four aspects, the research team published 28 papers, including 7 SCI indexed papers and 15 EI indexed paper, and 1 book. As to the patent aspect, we applied for 4 items and got 1 granted patent.

Key Words:Group behavior; Group emotion; Overlap community

阅读全文链接(需实名注册):http://www.nstrs.cn/xiangxiBG.aspx?id=49712&flag=1

新型高分辨率三维显示器件与系统的基础研究年度报告

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摘 要:波前重建(全息)是新型高分辨率动态三维显示技术的一种实现方式。空间带宽积是制约三维波前重建图像的视角范围、图像清晰度和尺寸等感知参数的重要物理因素。三维显示器件空间带宽积的扩展主要依赖像素尺度的微型化和显示屏幕的大型化。针对波前重建空间带宽积的扩展,在电-光调制器件方面,研究全相位调制LCoS器件像素微型化的新方法,通过分析液晶分子预倾角、像素单元介质薄膜、有序纳米结构对像素单元空间场强的影响,优化像素单元电场分布,为克服像素微型化带来的尺度效应提供理论依据。在像素单元CMOS电路方面,分析像素单元存储电容和负载电容的尺度效应及关联性。揭示硅基液晶LCoS等效电容尺度极限效应的物理机理。研究高迁移率非晶氧化物TFT材料,探索制备微米尺度像素阵列的新方法;通过超厚电极层等新工艺和铜合金等新材料的研究,为大尺寸显示器件的制备提供技术支撑。提出大尺寸、高效TFT阵列双边驱动新方法,解决电-光调制器件驱动提升的难题,突破微型化像素低压驱动的关键技术。在光-光调制器件方面,建立全息像元的空间带宽积理论模型,通过针对光折变材料的动力学机制开展研究,突破全息像元的角度、波长、偏振与相位复用关键技术,在光折