

则正好起到促进作用. 故此特提出如下建议,以期在我国物理学界树立高尚的科学道德作风,推进我国物理研究水平的切实提高:

(1)中国物理学会出版委员会召集一次会议,就 IUPAP 讨论会涉及的问题进行一次认真讨论;

(2)中国物理学会出版委员会加入此次会议的终结文件制定工作;

(3)根据 IUPAP 此次会议文件精神,中国物理学会应尽快制定自己的科学道德准则.

以上汇报,是我个人观感,所提建议仅供参考.不当之处,亦望指出.

(中国科学院理论物理研究所 刘寄星 2003 年 11 月 7 日)

International guidelines for ethical conduct in scientific publishing

(To be submitted for possible adoption to the International Union of Pure and Applied Physics)

In order to provide a common international reference for ethical behavior in scientific publishing, as well as to suggest appropriate responses to misconduct when it occurs, the following guidelines are proposed for the various parties in the scientific publication enterprise.

Institutions

The senior management of a university or research institution should set high standards for ethical behavior, including all aspects of research publication, and should actively post and promote these to employees. Institutions should establish research practices that minimize the possibility of misconduct and also protect the rights of younger researchers. Regular instruction in ethical behavior should be provided to employees.

Institutions should also establish procedures for objective investigation in the event of accusations of misconduct and outline penalties in the event of a positive finding.

Individual Researchers

Individual researchers should understand and scrupulously uphold high standards for ethical behavior in the conduct of research, particularly in relation to the verification and truthful reporting of data, the granting of proper credit, and referencing of the work of others in publication. Plagiarism of another's work is a form of theft and constitutes serious misconduct.

Individual researchers should ensure that institutional guidelines on ethics are known and upheld, and they

should promptly raise and resolve as appropriate any misconduct that may occur.

In publication it is essential that each co-author contributed significantly to the research reported, openly accepts joint responsibility for the work, and undertakes not to make multiple submissions of the same material. If these conditions of authorship cannot be met, the person should not be included as an author.

Journals

The senior management of scientific journals should establish and conspicuously post their standards for ethical behavior in publishing, and specify responsibilities and steps in investigating and responding to suspicions or accusations of misconduct. Journal managers should ensure that these standards are as clearly understood and upheld internally as they are externally. Journals should respond to author complaints with respect and due process but also keep community needs in mind in apportioning resources.

Journals should work closely and responsively together to resolve inter-journal problems such as plagiarism or duplicate publication. As far as is possible within the publication structure, journal management may establish private and public penalties for those found to have committed misconduct, be they authors, referees or editors.

Editors

Editors should adhere to high standards of ethical treat-

ment of all authors. They should conduct peer review with respect and dispatch, choose the best referees available for those papers selected for review, obtain timely reports, respond promptly to inquiries, and make a responsible and objective decision about publication. Editors will keep an author's best interests in mind, even when this means prompt rejection of unsuitable papers, so that these may be submitted to a more appropriate journal.

An editor will excuse himself or herself from editorial duties that would impose a personal, financial or professional conflict of interest. An editor will also avoid any misuse of privileged position or information to influence the handling of his or her own papers or those of colleagues or rivals.

Referees

Referees engaged in peer review have a duty to the community to undertake this work with diligence and

dispatch. They are trusted to provide a clear, prompt, and objective report, including sufficient detail to convince author and editor that the paper was read with due care.

A referee will excuse himself or herself from refereeing duties that would impose a personal, financial or professional conflict of interest, and will avoid the use of privileged information in a paper under review.

Professional Organizations

National and international professional organizations shall take a leadership position in establishing and stating standards of ethical conduct, developing these standards in consultation with membership, specialist committees and governing bodies. These standards should be well publicized and prominently posted. In addition, standards should be examined regularly and revised to cover appropriate publishing practice and any new situations as they arise.

科学出版中的道德行为国际准则 (提交国际纯粹与应用物理联合会备用)

为了给科学出版道德行为提供一个共同的国际准绳并建议在不端行为发生时的适当应对方式,特向科学出版业所涉及各方提出以下准则。

研究机构

大学和研究机构的高级管理部门应订立道德行为的高标准,涵盖研究出版的各方面,并积极向其雇员公示且推行。研究机构应当制定研究工作实施细则,将不端行为发生可能性减至最小并保护青年研究人员权利,且应向其雇员提供道德行为的例行教育。

研究机构还应当制定出对不端行为指控事件进行客观调查的程序以及对调查属实的当事人予以处罚的总则。

研究者个人

研究者个人在研究过程中应当了解并认真执行道德行为高标准,尤其在涉及核实和如实报告数据、合适地认定贡献及引用他人已发表工作的方面。剽

窃他人成果是一种盗窃行为并构成严重的不端行为。

研究者个人应确保自己知晓并遵守所在研究机构的道德准则,而且他们应能及时提出并妥善处理可能发生的任何不端行为。

发表论文有如下基本要求:每一个联名作者都应该对所报道的研究工作有显著贡献、公开承担该工作的共同责任,并保证不将该素材重复投稿。不符合上述作者身份条件者不应列为作者。

期刊

科学期刊的高级管理层应制定并醒目地公示其出版道德行为标准,并且明确规定出应对和调查有关不端行为的质询或指控的责任与步骤。期刊的管理者应确保以上标准被期刊编辑部内外一致地清晰理解并遵守。期刊应按规定程序郑重答复作者申诉,但也应考虑学术界的需要分配资源。

各刊物应密切协作,负责任地解决刊物之间诸

如抄袭或重复投稿等问题. 只要出版机构内部可行, 刊物管理部门可制定私下或公开处罚条例, 处置已被查明的犯有不端行为者, 无论其为作者、审稿人或编辑.

编辑

编辑应坚持以职业道德对待所有作者的高标准. 他们应郑重、迅速地实施稿件的同行评审, 为入选送审稿件选择可能的最佳审稿人, 按时取得审稿意见, 及时回复作者询问并对稿件的发表与否作出客观、负责的决定. 编辑应为作者的最高利益着想, 即使这意味着对不合用稿件的拒稿和及时退稿, 以便其转投合适的刊物.

编辑必须回避承担可能带来个人、财务或专业利益冲突的编辑任务. 编辑也必须避免任何误用其特殊地位或信息以影响对其自身稿件, 其同事或对手稿件的处理过程.

审稿人

审稿人介入同行评审, 对学术界负有努力、迅速地完成任务的责任. 他们受到信赖提供清晰、及

时且客观的审稿报告, 报告中应含有足够的细节, 使作者和编辑信服他们确曾足够细心、认真地阅读过被审稿件.

审稿人必须回避可能带来个人、财务或专业利益冲突的审稿任务, 而且必须避免使用审阅受审稿件所得特许信息.

专业组织

在制定和表述职业道德准则标准, 以及通过咨询本组织成员、专家委员会和组织理事会制订标准细则方面, 国内和国际专业组织具有领导地位. 这些标准应广为宣传并予特别发布. 此外, 标准条文应定期检查并加以修订, 以涵盖适当出版行规和适应出现的其他新情况.

(此中文译文由中国科学院理论物理所刘寄星、郑伟谋根据刊载于 <http://www.iupap.org/working/workshop.shtml> 网站的原文译出, 文中黑体为译者所加.)



· 物理新闻和动态 ·

用磁共振 – 原子力显微镜看到了单电子自旋

电子学器件尺度的日异减小, 使得器件的性能甚至会受到单原子杂质的影响. 因此, 对材料进行原子尺度的三维成像成为必要. 进而, 在未来的固态量子计算机中, 也将要求对单电子自旋进行探测. 传统的磁共振成像 (MRI) 技术可以对样品内部作出三维成像, 不过它的空间分辨率较低——为了产生可探测的信号, 要求在可分辨的最小体积中包含有足够多的原子核或电子自旋. 传统的原子力显微镜 (AFM) 可以分辨出单个原子, 但它们不可能给出样品深部的图像.

最近, 来自美国加州 IBM – Almaden 研究中心的 Rugar 等, 将三维 MRI 技术与高灵敏的 AFM 技术结合在一起, 实现了对单个电子自旋的观察和定位. Rugar 的装置包括: 对微弱力极为敏感的扫描探针悬臂、测量悬臂运动的光学干涉仪、用于产生静磁场的磁体和激发磁共振的线圈. 被测样品 (包含有低密度电子自旋的玻璃态 SiO₂) 被置于悬臂头部探针的下方. 微米尺度的探针由微磁体制成, 它可以在周围 250nm 的范围内产生大的梯度磁场 ($\frac{\partial H}{\partial x} \sim 2\text{Gs/nm}$). 位于样品内部的单电子自旋与该梯度场的相互作用力 $F = g\mu_B \frac{\partial H}{\partial x} = 2 \times 10^{-18}\text{N}$, 其中 g 是朗德因子, $s = 1/2$ 是电子自旋, μ_B 是玻尔磁子. 注意: 当自旋量子数在 $s = \pm 1/2$ 两者之间变换时, 该力也随之改变方向. 这个力决定了悬臂的振动, 从而使单电子自旋的存在成为可探测.

梯度磁场还有另一个独立功能: 通过测量磁共振发生的频率, 可以定出对共振信号负有责任的单电子所处的空间位置. 在静磁场 H_0 的环境中, $s = \pm 1/2$ 两个电子态的能级差 $\Delta E = g\mu_B H_0 = h\nu_0$. 其中 ν_0 是激发共振的微波频率. 由于在 H_0 的基础上加上了梯度场 $\frac{\partial H}{\partial x}$, 磁共振频率将漂移到 $\nu_x = (H_0 - \frac{\partial H}{\partial x}x)g\mu_B/h$, 于是, 通过测量 ν_x , 即可决定单电子自旋与微磁体探针之间的距离 x .

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