

# Physics

## Proposal to form a **Physics Bylaw 55 Unit** at UC Merced

### Table of Contents

1. Mission.....	1
2. Local Rationale.....	1
3. Global Rationale.....	2
4. Specific Goals.....	2
5. Membership of Physics unit.....	3
6. Affiliate Members.....	3
7. Research Foci.....	4
8. Funding Opportunities.....	4
9. Undergraduate Teaching Foci.....	4
10. Graduate Teaching Foci.....	4
11. Growth Objectives.....	4
12. Administrative Resources and Procedures.....	4
13. Consultation with Faculty.....	8
14. Summary.....	9
15. Appendix A (unit forming letter).....	10
16. Appendix B (current members).....	11

**Preamble.** Physics is at the foundation of many subjects of modern science and technology. With a broad scope ranging from particle physics, condensed matter physics, atomic, molecular, and optical physics, astronomy, to the new branch of biophysics, Physics exists in nearly all aspects of our life. Here, we formulate the Physics Bylaw 55 Unit at UC Merced to incorporate the scientific and intellectual context of Physics.

### **1. Mission**

The Physics Bylaw 55 Unit brings together faculty in the School of Natural Sciences in all areas of physics research and teaching. Physics faculty members are dedicated to synergizing research and teaching in interdisciplinary endeavors, including for atomic, molecular, and optical (AMO) physics, condensed matter physics, soft matter physics, biophysics, energy research, and particle physics. These research areas and their ties to material sciences, biology, applied math, and chemistry research reinforce UC Merced's strengths in interdisciplinary research in both the School of Natural Sciences and the School of Engineering.

### **2. Local Rationale**

The 2008 draft of the Strategic Academic Plan for the School of Natural Sciences (SNS) at UC Merced identified an interdisciplinary and multidisciplinary research theme of Natural Sciences/Physics as a campus-wide nexus of research excellence and teaching strength. By further building on this identified strongpoint, the university can greatly increase its national and international reputation. At UC Merced, Physics comprises a range of research areas that overlap with one another, including atomic, molecular, and optical (AMO) physics, condensed matter physics, soft matter physics, biophysics, energy research, and particle physics.

The Physics Bylaw 55 unit will perform similar functions as other bylaw units inside SNS (promotion and tenure, hiring, strategic planning, and curriculum

development), with no official relationship to other academic activities. For example, the management of research collaborations, graduate programs, and grants will continue to be handled by other pre-existing university structures. In this document, we outline the intellectual overlap that the Physics Bylaw 55 unit will share with those activities, but there will be no administrative constraints placed on those activities by the Physics Bylaw 55 unit.

### **3. Global Rationale**

The interdisciplinary study of the physics faculty in the School of Natural Sciences reflects recent trends in research funding, in university faculty lines, and in industry jobs. A Physics Bylaw 55 unit at UC Merced has the potential to draw the attention of scientists in academia internationally and to encourage partnerships with technology companies in nearby Silicon Valley. It will help the campus establish itself as a research university that conducts innovative scientific projects, particularly experimental and theoretical work with an eye toward concrete applications in industry, education, environmental management, and government, as well as in non-governmental organizations. This research theme requires no new resources to initiate, as there is already substantial momentum at UC Merced in this general area.

This research momentum can be seen in existing collaborations between Physics and other natural science faculty involving NSF-funded projects on biophysics research, on quantum information research, on solar energy research, and on material science research. Research collaboration potentials also exist between members within Physics, as well as between members of Physics and members of other units in SNS, as well as in the Schools of Engineering. It is fully expected that the interdisciplinary nature of this Physics Bylaw 55 unit will promote synergistic collaborations both within and across its faculty membership delineations.

### **4. Specific Goals**

The Physics Bylaw 55 unit upholds a number of specific goals. Primary members of the unit endeavor to achieve all of these specific goals, whereas Affiliate members typically share a subset of these specific goals:

- i) Provide interdisciplinary undergraduate teaching that combines: a) knowledge and laboratory experience in the basic science of physics and b) knowledge and technical experience in the solving problems and learning.
- ii) Raise the visibility of the Physics Bylaw 55 unit in particular, and of UC Merced in general, by publishing academic books, edited volumes, and peer-reviewed articles in well-respected journals that are central to the Natural Sciences, such as *Science*, *Nature*, *Nature Physics*, *Nature Materials*, *Nature Photonics*, *Physical Review Letters*, *Physical Reviews*, *Nano Letters*, *Applied Physics Letters*, *Optics Letters* and *Energy Express*.
- iii) Obtain grant funding from federal sources (such as NSF, DOE, NIH, DOD), state sources (such as the California Energy Commission and various state agencies), and industry sources (such as research companies in Silicon Valley) to support our efforts in primary scientific research, undergraduate research experience, and graduate student training.
- iv) Attract the best graduate students to our related graduate groups, and provide world-class training for them that successfully places them in tenure-track jobs in academia, professional jobs in industry, and public service careers in

governmental and nongovernmental organizations, in the natural sciences.

- v) Provide credible and knowledgeable peer-review in promotion cases of our primary faculty members.
- vi) Maintain rich and productive collaborative research and teaching relationships with faculty in neighboring academic areas, such as Applied Math, Chemistry, and Material research.
- vii) Serve as a burgeoning group from which new dynamic lines of interdisciplinary research will emerge, such as solar energy research.

## **5. Current Members of the Physics Bylaw 55 unit**

At the forming of the Physics Bylaw 55 Unit, the members include:

List of Primary Faculty Members (with voting privileges): Dr. Roland Winston (Professor Above Scale, SNS and SENG), Raymond Chiao (Professor Emeritus, SNS), Kevin Mitchell (Associate Professor of Natural Science, SNS), Sayantani Ghosh (Assistant Professor of Natural Sciences, SNS) , Linda Hirst (Assistant Professor of Natural Science) Lin Tian (Assistant Professor of Natural Science), Jay Sharping (Assistant Professor of Natural Science), Ajay Gopinathan (Assistant Professor of Natural Science), Michael Scheibner (Assistant Professor of Natural Science)

List of Adjunct (non-voting) Members: (Associate Adjunct Professor of Physics, SNS)

Temporary Members:

## **6. Affiliate Members**

Potential Affiliate Members from all three UCM Schools are identified by noting the degree of overlap between their research interests and the Mission of the Physics Bylaw 55 unit, as well as their fit with the Specific Goals of the Physics Bylaw 55 unit. Where undergraduate course topics, publication outlets, and/or granting sources are in common (Specific Goals i-iii), but there are differences in types of graduate student placement and/or familiarity sufficient for review of promotion cases in physics/natural sciences (Specific Goals iv-v), it is concluded that such faculty were ideal candidates for Affiliate Membership in the Bylaw 55 unit. Affiliate Members of the Physics Bylaw 55 unit have their primary membership in other Bylaw 55 units. Affiliate Members do not have voting rights in the Physics unit. The Physics Bylaw 55 unit will not play any formal role in the promotion and tenure cases of its Affiliate Members. Affiliate membership is solely intended to promote cross-disciplinary interactions in research, in graduate student training, and in undergraduate teaching.

Nomination Procedures. Any Primary Faculty Member of Physics can nominate a faculty member for consideration as an Affiliate Member of Physics. The primary Physics faculty then vote on that candidate for affiliate membership (with the default being an open committee meeting vote, which can be converted to secret ballot vote upon any Primary Faculty Member's request). Upon obtaining a majority vote in favor, the academic personnel chair will extend an invitation to the candidate for becoming an Affiliate Member of Physics.

Affiliate Members are granted the following privileges:

- a) A listing in the Affiliate Member section of Natural Sciences webpage, with a

link to their own homepage

b) Affiliate Members are permitted to sign their names on UCM letterhead as "...Professor of [Home Specialty], and of Natural Sciences"

c) For only non-personnel meetings, Affiliate Members have the right to: "notice of meeting", "materials relevant to the meeting", and "privilege of the floor"

Current List of Affiliate Members

## **7. Research Foci**

Atomic, Molecular, and Optical Physics

BioPhysics

Condensed Matter Physics and Material Research

Energy Research

soft matter physics

## **8. Funding Opportunities**

There is excellent potential for unique funding opportunities to conduct interdisciplinary research in the group. Physics members have already obtained NSF funding for interdisciplinary research on dynamical systems, quantum information, condensed matter physics, soft matter physics, and biophysics. NSF funding has also been obtained to develop instrumentations. DARPA funding has been obtained for a project aimed at light-matter interface, nonlinear optics, gravitational wave research, and development of portable photovoltaic devices. The California Energy Commission is funding solar energy research. Foundation funding has been significant; the Dan David Foundation supports student fellowships in solar energy and the California Community Foundation is supporting nonimaging optics and solar energy research. UC Merced leads UC Solar, a multi campus research institute launched in 2010 which includes faculty from Physics and Engineering as well as faculty from UC Berkeley and UC Santa Barbara.

## **9. Undergraduate Teaching Foci**

The undergraduate majors handled by the Physics faculty grant B. S. in Physics.

Tracks within majors. We currently have four emphasis tracks in Physics for undergraduate physics majors: Atomic, Molecular, and Optical (AMO) Physics; Mathematical Physics; Biophysics; and Condensed Matter and Materials Physics.

Minors. There also exists minor in Physics.

## **10. Graduate Training Foci**

The graduate programs to which various Physics faculty contribute are the following: Atomic, Molecular, and Optical Physics, Condensed matter physics and material research, soft matter and biophysics, and energy research.

## **11. Growth Objectives**

The growth of the Physics Bylaw 55 Unit will be guided by an emphasis on research excellence and interdisciplinarity. Strategic plans for this growth will take into account the realistic anticipation that genuine departments will eventually be formed at UC Merced, and that certain subareas within the Physics group may at some point become large enough to form their own departments.

Nonetheless, the Physics Bylaw 55 Unit can outline at this point some hiring priorities for the next 3-year cycle (in alphabetical order): biophysics, soft condensed matter physics; one or both may be experimental.

## **12. Administrative Resources and Procedures**

Academic Personnel Chair. It is understood that the dean of SNS makes the decision of whom to appoint as the Chair of Physics, and the Physics faculty wish to provide consultation for this appointment process in the form of a democratic vote that results in a recommendation to the dean. The term for the academic personnel chair of Physics is one year. The recommendation to the dean for chair of Physics will be voted on by majority (secret ballot) vote every year, near the end of the spring semester for the upcoming academic year.

Voting Procedures. The primary faculty also voted unanimously to restrict secret ballot voting to chairperson elections and personnel cases. (Nonetheless, in accordance with bylaw 55, if any Physics faculty member wishes to change an open vote into a secret ballot vote, he/she can do so by simply requesting it.)

Meetings. The Physics bylaw 55 unit (or appropriate portions thereof) will meet semi-regularly (at least once per semester) to address P&T and hiring cases, as well as to discuss strategic plans for further growth. The chair of Physics will coordinate with the existing administrative staff of the School of Natural Sciences to ensure that no additional administrative staff members will be needed to handle the business of the Bylaw 55 unit. It is confidently expected that the members of this Bylaw 55 unit will continue to cooperate smoothly with one another, as they have for the past 12 months in the form of a de facto faculty unit, to make the day-to-day management of the unit efficient and effective. The Chair shall have such authority and responsibilities specified in APM-245 as are delegated to the Chair by the Chancellor or Chancellor-Designate. The Faculty shall have such authority and responsibilities as are delegated to them in pertinent governing documents, including but not limited to the Bylaws and Regulations of the UC Academic Senate, the UC Academic Personnel Manual, the UC Merced Divisional Bylaws and Regulations, and the UC Merced Personnel Policies and Procedures Manual. The Physics Bylaw Unit will generally function as a committee of the whole. The Faculty may appoint such committees as it deems necessary to conduct its business, and may delegate to those committees such duties and responsibilities as it deems necessary, except for any duties and responsibilities that governing legislation and documents prohibit from delegation.

Voting Privileges. The Physics Bylaw Unit will adhere to the articles of Bylaw 55 (see below) in the Bylaws of the Academic Senate, University of California. In accordance with bylaw 55.C, all Tenured Academic Senate faculty in Physics have the right to vote on all new departmental appointments that confer membership in the Academic Senate (see italicized text in Article B1 below). Tenured academic senate faculty can vote to extend voting rights on hiring to all other faculty.

### Article A. General Provisions

1. According to the Standing Orders of the Regents, ". . . the several departments of the University, with the approval of the President, shall determine their own form of administrative organization . . ." No department shall be organized in a way that would deny to any of its non-emeritae/i faculty who are voting members of the Academic Senate, as specified in Standing Order 105.l(a), the right to vote on substantial departmental questions, excepting only certain personnel actions as detailed in Article B of this Bylaw.

2. In all matters other than those specified in paragraphs 1 to 5 of Article B of this Bylaw, the right to vote may be delegated to duly elected committees.

#### Article B. Designation of Voting Rights

1. All tenured academic senate faculty in a department have the right to vote on all new departmental appointments that confer membership in the Academic Senate. Prior to such a vote, all the non-emeritae/i departmental members of the Academic Senate must be afforded an opportunity to make their opinions known to the voters. Only tenured academic senate faculty can vote to extend voting rights on hiring to all other faculty.
2. Professors have the right to vote on all cases of promotion to the ranks of Professor. Professors and Senior Lecturers with Security of Employment (SENG) have the right to vote on all cases of appointment or promotion to the rank of Senior Lecturer (SENG).
3. Professors and Associate Professors have the right to vote on all cases of promotion to the ranks of Associate Professor, Associate Professor-in-Residence, and Associate Professor of Clinical (e.g. Medicine). Professors, Associate Professors, Senior Lecturers (SENG) and Lecturers (SENG) have the right to vote on all cases of appointment to the rank of Lecturer (SENG).
4. For voting purposes, all cases that involve the removal of the Acting modifier from the title of a member of the Academic Senate shall be treated as promotions to the rank in question.
5. All cases of nonreappointments or terminations of Assistant Professors, Assistant Professors-in-Residence, and Assistant Professors of Clinical (e.g. Medicine), or Lecturers and Senior Lecturers, shall be voted upon by those faculty eligible to vote on promotions to the ranks of Associate Professor, Associate Professor-in-Residence, Associate Professor of Clinical (e.g. Medicine), or appointments to the titles Lecturer (SENG) and Senior Lecturer (SENG), respectively.
6. All cases of advancement within any rank that confers membership in the Academic Senate shall be voted upon by those persons entitled to vote on promotion or non-reappointment to the rank in question under the provisions of Paragraphs 2 to 5 of this Article B.
7. In none of the instances specified in Paragraphs 1 to 5 of this Article B may the right to vote be delegated to a committee. The actual method of voting shall be determined by the eligible voters; subject, however, to the provision that no voter may be denied the option to require a secret ballot. In cases of advancement within rank, the eligible voters for each rank in question shall either follow the same procedures used for promotions and non-reappointment or may, by two thirds majority vote and subject to the approval of the divisional Committee on Academic Personnel or its equivalent, delegate the authority for such actions to a duly elected committee or other agency, or adopt some other method acceptable to the divisional Committee on Academic Personnel or its equivalent. Any such method or delegation of authority shall remain in effect for at least one calendar year (twelve months). Thereafter, upon the request of any faculty member entitled to a vote on the cases in question under the provisions of Paragraph 6 of this Article B, the eligible voters shall reconsider the question of how cases shall be handled.
8. The tenured faculty members of a department shall establish the method by which personnel matters other than those listed in Paragraphs 1 to 6 of this Article B are determined. The method adopted must have the approval of the divisional Committee on Academic Personnel or its equivalent.

Article C. Extension of Voting Privileges to non-Emeritae/i Faculty Voting  
privileges on personnel matters within any department may be extended to one or more of the classes of non-Emeritae/i Academic Senate members of that department, as a class, who are not otherwise entitled to vote under the provisions of paragraphs 1 to 6 of Article B of this Bylaw, upon at least a two-thirds majority vote by secret ballot of those faculty entitled to vote on the cases in question under the provisions of paragraphs 1 to 6 of Article B of this Bylaw. Any extensions of the voting privilege under this Article C must remain in effect for at least one calendar year (twelve months); thereafter, any faculty member entitled to a vote on the cases in question under the provisions of paragraphs 1 to 6 of Article B of this Bylaw may request reconsideration. Following a request for reconsideration, and prior to any subsequent vote on the cases in question, the Chair or other appropriate departmental officer shall put the question of renewal of privileges to a vote. An extension of voting privileges will be renewed only upon at least a two-thirds majority vote by secret ballot of those faculty entitled to vote on the cases in question under the provisions of paragraphs 1 to 6 of Article B of this Bylaw.

- i. **Lecturer with Potential Security of Employment have no voting rights in departmental issues**
- ii. **Voting rights can be extended to Temporary Members. Only tenured academic senate faculty can vote to extend voting rights to Temporary Members. (Temporary Member is a two-year appointment with full voting and discussion rights, as appropriate to the rank, with the exception of voting on/discussing temporary appointments. No teaching is expected.)**

Article D. Rights and Privileges of Emeritae/i Faculty (En 4 May 95)

1. Emeritae/i members of the Academic Senate retain membership in the departments to which they belonged at the time of their retirement. They do not have the right to vote on departmental matters, except as provided in this Article D.
2. With the exception of personnel actions, Emeritae/i members of the department have the right to receive the same notice of meetings as other Academic Senate members. They have the right of access to materials relevant to those meetings, the privilege of the floor at those meetings, and the right to make their opinions known to the voting members.
3. Emeritae/i, while recalled to service in a department from which they have retired, regain voting rights on all departmental matters, except personnel matters, during the period of such service. They may be accorded voting privileges on personnel matters only as a class consisting of all recalled Emeritae/i and only as specified in paragraph 4.c of this Article D.
4. Additional privileges in a department from which they have retired may be extended, either to all Emeritae/i as a class of the whole, or to all Emeritae/i recalled to active service, during the period of such service, as follows.
  - a. Voting privileges on all non-personnel matters may be extended to all Emeritae/i upon a majority vote by secret ballot of the all Tenured non-Emeritae/i Academic Senate membership of that department.
  - b. The privilege of notice of meeting on personnel actions, access to materials, and/or privilege of the floor may be extended to Emeritae/i upon at least a two-thirds majority vote by secret ballot of those faculty entitled to vote on the cases in question under the provisions of paragraphs 1 to 6 of Article B of this Bylaw.
  - c. Voting privileges on personnel matters may be extended to Emeritae/i upon at least a two-thirds majority vote by secret ballot of those faculty entitled to vote on

the cases in question under the provisions of paragraphs 1 to 6 of Article B of this Bylaw.

i. Any extensions of privilege to Emeritae/i under paragraph 4 of this Article D must remain in effect for at least one calendar year (twelve months); thereafter, any faculty member entitled to a vote on the question of an extension of privilege under the provisions of paragraph 4 of this Article D may request reconsideration. Following a request for reconsideration, and prior to any subsequent vote on the cases in question, the Chair or other appropriate departmental officer shall put the question of renewal of privileges to a vote. An extension of privilege will be renewed only under the procedures specified for the initial extension of voting privileges by paragraph 4 of this Article D.

#### Article E. Temporary members with the possibility for renewal

1. This is a two-year appointment with full voting and discussion rights, as appropriate to the rank, with the exception of voting on/discussing temporary appointments. No teaching is expected.

2. Membership can be renewed after two years.

3. All ladder rank faculty in the Physics bylaw group have the right to vote on all temporary memberships.

4. Tentative list of temporary members includes

#### Article F. Participation of faculty from other groups

1. Affiliates: This is a two-year appointment with full discussion rights, but no voting rights. No teaching is expected. Membership has to be renewed after 2 year.

2. Half-appointment member: This appointment has full voting and discussion rights, as appropriate to the rank. Teaching expectations are one class per year averaged over five years.

3. All ladder rank faculty in the Physics bylaw group have the right to vote on all affiliate and half-appointment memberships.

### **13. Consultation with Faculty**

All faculty in the Physics Bylaw Unit have agreed upon this document. We are seeking support from all other faculty in SNS.

In addition to the general SNS-wide and campus-wide support for forming this bylaw unit, this proposal includes in its appendices written letters of support from the Academic Personnel Chairs, and also written letters of support from the Dean of the Division of Natural Sciences at UC XX (Professor XX) and the Dean of the School of XX at UC XX (Professor XX). These letters eloquently describe the benefits that the Physics Bylaw Unit can impart to SNS in particular, as well as to UCM in general.

### **14. Summary**

In sum, the Physics Bylaw 55 Unit integrates interdisciplinary research areas with

compatible goals, interests, and resource needs. The formation of this Bylaw 55 Unit provides unique opportunities for research, training, funding, and program building in SNS and on the campus at large. Our common interests will foster novel and viable areas of research and teaching, and enable thematic coherence, administrative cooperation, and personal collegiality.

Appendix A unit forming letter

School/Unit Name Natural Science, Physics Date Filed \_\_\_\_\_

\_\_\_\_\_  
Academic Personnel Chair name

1. The School/Unit letter will be reviewed by: \_\_\_\_\_

All members of the School/Unit eligible to vote on the action.

A committee acting on behalf of the School/Unit. If this item is checked, indicate below how the committee is selected.

2. In this School/Unit, voting rights are as follows:

The unit follows the policy set out in Academic Senate Bylaw 55 exactly. The vote is not extended beyond the minimum voting membership specified there (i.e., regular rank faculty of equivalent rank to proposed action).

The unit extends the vote beyond the minimum specifications as described below. (Indicate who may vote and, if necessary, on what action.)

Tenured *and untenured* Academic Senate faculty have the right to vote on all new departmental appointments that confer membership in the Academic Senate.

3. All voting members of the School/Unit are aware of the following principles pertaining to conflict of interest:

- As set out in APM 520-16, it is against University policy for a faculty member to participate in the personnel review of a near relative or domestic partner.
- It is never permissible for a faculty member to vote on his or her own personnel case.

4. If this School/Unit does not have a formally appointed administrative chair, indicate below who will be responsible for the duties of "department chair" as specified in APM 210 and 220.

Roland Winston Signature \_\_\_\_\_ Date \_\_\_\_\_

Dean's signature \_\_\_\_\_ Date \_\_\_\_\_

VP of AP signature \_\_\_\_\_ Date \_\_\_\_\_

## Appendix B Current Members

At the forming of the Physics Bylaw 55 Unit, the members include:

### List of Primary Faculty Members (with voting privileges):

Roland Winston (Professor Above Scale, SNS and SENG)  
Raymond Chiao (Professor Emeritus, SNS)  
Kevin Mitchell (Associate Professor of Natural Science, SNS)  
Sayantani Ghosh (Assistant Professor of Natural Sciences, SNS)  
Ajay Gopinathan (Assistant Professor of Natural Science)  
Linda Hirst (Assistant Professor of Natural Science)  
Jay Sharping (Assistant Professor of Natural Science)  
Michael Scheibner (Assistant Professor of Natural Science)  
Lin Tian (Assistant Professor of Natural Science)

List of Adjunct (non-voting) Members: (Associate Adjunct Professor of Physics, SNS)

Temporary Members: