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PHYSICS DEPARTMENT

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GRADUATE MANUAL

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2009 – 2010

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## SCHEDULE OF EVENTS

DATE	TIME	EVENT	PLACE
August 21 – Friday	8:30 AM	All new graduates meet with Dr. Dick Smith, Department Head	258 EPS
	9:00 AM	All new graduates meet with grad reps: Michael Lerch and Greg Gabrielsen	258 EPS
	9:30 AM	New graduates meet with Front Office Staff	258 EPS
	10:00 AM	New domestic (non-resident) graduates meet with Michael and Greg	258 EPS
	10:30-4:00 PM	New graduates meet with Graduate Committee <b>See Margaret for sign-up time before the 21<sup>st</sup>.</b>	258 EPS
August 24 – Monday	8:30 AM - 4:00 PM	New <b>International</b> students attend International Student Orientation. <b>Mandatory.</b>	SUB Ballroom D
August 25 – Tuesday	3:00 PM	SPEAK exam for all new <b>international</b> students that have not provided a passing TSE score. <b>Mandatory.</b>	333 Reid
August 27 – Thursday	9:00 AM – 12:00 PM & 1:00 PM – 5:00 PM	DIVISION OF GRADUATE EDUCATION ORIENTATION <b>Mandatory attendance to both sessions for all new Physics graduate students</b>	346 JONH (AM) 339 JONH (PM)
August 29 – Saturday	9:00 AM ~ 3:00 PM	Geeks in the Creek – float on the Madison River. See fliers for more information.	
August 31 – Monday		Classes begin.	
September 4 – Friday	4:30 PM	\$40 late fee assessed at 4:30 PM for students who have not registered for classes, confirmed attendance or paid fees. Last day to add courses using MyInfo.	
September 7 – Monday		Labor Day Holiday. No classes. Offices closed.	
September 9 – Wednesday	6:00 PM	DIVISION OF GRADUATE EDUCATION ORIENTATION <b>Mandatory attendance for new Physics graduate students</b> You must RSVP to the Graduate Office Evening reception & dinner.	994-4145 SUB Ballrooms A, B, & C
September 12 – Saturday		Physics Fall Party! More details later.	
September 14 – Monday		After this date, <b>ADDS</b> are permitted for extraordinary reasons only.	
September 21 – Monday	4:30 PM	Students who have not paid their fees, validated or made arrangements with Financial Aid will lose their classes at 4:30 PM. No refunds for classes dropped after this date. Last day to drop classes without a grade. \$80 late fee assessed at 4:30 PM for all registered	

		students who have not confirmed their bill (paid fees)
DATE	EVENT	PLACE
September 22 – November 20	Dropped courses are graded “W”.	
October 26, 2009 – January 12, 2010	Advising/pre-registration for Spring 2010.	
November 11 – Wednesday	Veteran’s Day Holiday. No classes. Offices closed.	
December 11 - Friday	Fee payment or attendance confirmation for Spring 2010 in the Student Accounts Office or on the Web.	103 MT Hall
November 23 – December 18	No DROPS allowed.	
November 25 – 27, Wednesday-Friday	Thanksgiving Day Holiday. No classes W, R, F. Offices closed R, F.	
December 14 – 18	Final exam week – Fall semester ends!	
January 13, 2010 Wednesday	Spring Semester begins.	

## GENERAL INFORMATION FOR GRADUATE STUDENTS 2009-2010

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### WE WELCOME THE FOLLOWING NEW GRADUATE STUDENTS

Ernest Amouzou, Neilya Beisenkhanova, Erin Casey, Aaron Christian, Bret Davis, Michael Freed, Chris Lowder, Jared Rice, Maxim Shchemelinin, Geoff Wicks

### KEYS

A Key Requisition is in your mailbox. Take the requisition to the Plew Building, located at 6<sup>th</sup> and Grant Streets. Keys can be picked up from 9 a.m. – 4 p.m., Monday – Friday. Be sure to take a picture I.D. with you.

### PHYSICS ADMINISTRATION STAFF

Sarah Barutha – Department Manager  
Margaret Jarrett – Graduate Program Coordinator, receptionist, student affairs  
Jeremy Gay – Computer Systems Administrator  
Sherry Heis – Fiscal and Operations Manager  
Brian Kay – Travel Coordinator

### SHOPS AND SERVICES STAFF

Norm Williams – Machine Shop Supervisor  
Bo Glaspey – Electronics Shop Supervisor  
Jerry DiMarco – Instructional Lab Supervisor

Please see these individuals regarding their policies and procedures.

Mail, handouts, and other information will be in your mailboxes in the front office. The bulletin boards inside and outside of the main office contain information on registration, courses, colloquia, and other events of interest. Of special interest to you will be items listed under headlines “TODAY”, “THIS WEEK, and “GRAD STUDENTS” – **you are responsible** for being aware of what has been posted each day. Margaret Jarrett is in charge of Student Affairs and will be glad to be of assistance to you. She keeps many of the forms you will need in order to register, apply, submit or whatever to keep the cogs turning.

In addition the department communicates information via electronic mail. It is important that you apply for a computer account and set up email services. The department also maintains a World Wide Web page, <http://www.physics.montana.edu> and encourages you to create a personal home page to be linked to the Physics departmental page. Please see Jeremy Gay for information regarding computer account setup and web page creation. Also, every student at MSU has a campus account, set-up as follows: [1stname.lastname@myportal.montana.edu](mailto:1stname.lastname@myportal.montana.edu). You are responsible for checking this site for University announcements.

**EVENINGS, HOLIDAYS, and WEEKENDS POLICY: ABSOLUTELY NO ONE IS TO BE IN THE EPS BUILDING DURING THESE TIMES EXCEPT FACULTY, STAFF, AND STUDENTS WHO HAVE BEEN ISSUED KEYS. DO NOT LET ANYONE IN! NON-PHYSICS PERSONNEL ARE NOT TO USE THE COMPUTER ROOM! ANYONE WHO BELONGS IN THE BUILDING HAS A KEY. There is NO access to the main office, unless you have the proper level key.**

ALL TAs – Give Margaret J. your Schedule Cards by August 21st. Please note that your teaching assignments are contingent upon receipt of your schedules.

INFORMATION pertinent to graduate school is online; pertinent to the Department is the departmental handout, “Physics Graduate Manual”, also accessible online.

RESIDENCY REQUIREMENT – Contact the Registrar’s Office (ask for Bonnie) immediately to begin establishing Montana residency (for U.S. citizens only). You must immediately get a Montana drivers license, voter registration, car registration, etc.. This is extremely important for GTAs, as you are granted only one year of out-of-state incidental fee waiver. This is solely your responsibility – you must do the foot/paperwork. \*This applies if you are taking the 6-credit route (be sure to talk with the Graduate Committee and your Graduate Representatives).

SOCIAL SECURITY NUMBERS – All new foreign students must apply for a social security card. Office of International Programs (Culbertson Hall, Room 400) will provide the time requirements (usually you need to wait 10 days before you can apply) and application form to submit to the Social Security office at 3205 N. 27<sup>th</sup> Avenue (phone: 586-4501). After you receive your social security number, leave a copy of the card with Sarah (physics office) and Payroll (Montana Hall, Room 18). Until you receive your social security number, you will receive a paycheck; however, it will be taxed at a higher rate.

GRADUATE OFFICE (108 Montana Hall) – Become familiar with this office – you will interact with them frequently. Your Graduate Committee Forms and Graduate Program Forms must be filed with this office. Refer to the Division of Graduate Education <http://www.montana.edu/wwwdg/> online.

PAYROLL SERVICES – Room 19 Montana Hall processes your monthly paychecks. Domestic students: Should have already filled out forms for income taxes, employment eligibility, etc. Foreign students: Report to the Office of International Education, room 400 Culbertson, to obtain these forms; turn them in to the Payroll Services Office.

STUDENT FACILITIES - A desk, chair, file drawer with key, surge protector, wastebasket, coat hook, network connection, and two book crates are provided in each assigned cubicle. Please treat these items and your space with care and respect, as they must be used for many years to come. Do NOT change cubicles or rooms unless your request is approved by Sarah. Please respect the rights and privacy of others, and be aware of potential security problems. If you bring in a computer for your desk, please see Jeremy Gay for assistance in setting it up on the network. When unoccupied, keep office doors locked to avoid theft.

DEPARTMENT CUSTODIAN – Cleans the floors and empties the wastebaskets (must be left out in the hall). Each student is responsible for keeping individual cubicles neat and clean.

DAYTON CONFERENCE ROOM (258 EPS) - This room is used for faculty meetings, seminars, and oral exams. It is available by reservation – see Margaret in the front office. Please treat this room gently. Clean boards and tables when you are leaving, and make sure lights are off.

SEMINAR ROOM (235 EPS) – Formerly the Department Library. You will find a variety of job notices posted here for post-graduate positions. This room is also used for small meetings when the conference room is in use - see Margaret for reservations.

COMPUTER ACCOUNTS – See Jeremy Gay to open a computer account. Computers are available in Room 230 for your use.

COMPUTER ROOM (Room 230) – The computers in this room are for the use of Physics students to perform research and other tasks related to their education here at MSU. Any questions regarding use or upkeep of the computers should be directed to Jeremy Gay.

PHOTOCOPIES – Photocopied material, for anything unrelated to your teaching duties, is 7 cents per copy. Pay Margaret Jarrett.

TELESCOPE CHECKOUT – The Department has a variety of telescopes available to be checked out for hosting star parties or for personal star viewing. A short training program is required to use this checkout system. Afterwards, a key can be checked out from Jerry DiMarco (manager of demos and instructional labs) in AJM 124. For more information, contact Tom Rust at x6718 or Jerry at x6161.

HEALTH SERVICES – Student Health Insurance is mandatory if you register for more than 6 credits; insurance fees will be waived if you show proof of other insurance. When you register for more than 6 credits, your health and dental fees entitle you to use the Student Health Services. Call them at x2311 or Student Insurance at x3199 for details. You must request health and dental insurance coverage when you register.

CREDITS – All graduate students must register for a minimum of nine credits each semester unless exempted by the Graduate Committee. Also, you must register for at least nine credits or social security taxes will be withheld from RA and TA stipends. You must have at least 6 credits to qualify for fee waivers during the academic year (review pros and cons with Graduate Committee!). Students seeking residency will be allowed to register for 6 credits during their first academic year.

GTA ASSIGNMENTS – These are made the first few days of classes each semester.

PERSONAL MAIL – Must be sent to home addresses.

ADDRESS – Give local address and telephone number to Margaret Jarrett.

NO SMOKING – The EPS building has been designated a “no smoking” building.

MSU TELEPHONE POLICY – University telephone equipment is state property. As such, state telecommunications equipment is provided for official state business. Certain exceptions, however, are allowed. Employees may use state telephones for local and long distance calls to latch-key children, teachers, doctors, day-care centers and baby sitters, to family members to inform them of unexpected schedule changes, and for other essential personal business. When employees need to make a personal long distance call for one of the purposes described above, long-distance service access may be made by entering 9 + 0 + the area code + the phone number. The caller must then reverse the charges, charge to a third party (non MSU number) or charge to a personal telephone calling card. Third party calls are not allowed. In no instance should a personal call be made using the state network, even if the state is subsequently reimbursed

ACCESS TO MAIN OFFICE (264 EPS) – The key you have been issued gives you access to the EPS building, your office, and various controlled-access rooms. You will NOT have access to the main office outside of normal business hours (M-F, 8-5, closed over the noon hour).

## PURCHASING INFORMATION

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PURCHASING –BEFORE YOU BUY ANYTHING THAT IS TO BE PAID FOR BY THE DEPARTMENT OR A RESEARCH GRANT (pencils for teaching or major equipment for a lab for example), please check with Sherry Heis. The electronics lab (219 EPS) has some electronics items in stock. Some office supplies are available in the front office (check with Margaret). Some items cannot be purchased from any location other than on campus, or certain purchasing procedures may need to be followed. If you buy something without going through the proper channels, you may be required to pay for it out of your own funds. Please check with Jeremy Gay regarding computer software site licenses and special computer purchasing guidelines before purchasing computer hardware or software.

DEPARTMENTAL PURCHASE ORDERS (DPO) – When placing orders by phone, fax, mail, or buying direct from off-campus vendors fill out a DPO form. DPO forms can be picked up from Sherry. Be sure that you include your name on the DPO form and make sure the vendor knows to ship the package to your attention. It saves time and frustration if vendors don't have to call back asking for clarification or needing more information from you. Remember there are approximately 150 faculty, staff and students working in the department and in labs. After you receive a package, double check that all items were received. Give Sherry the packing slip with a notation if everything was received and undamaged. Be sure to note any missing items or items that need to be returned. This process will ensure that all items listed on the invoice for payment should actually be paid. A credit should be issued for missing or damaged items or a new invoice where only the correct charges will be paid. Any invoices or credit memos that you receive must be given to Sherry.

CHARGES OFF-CAMPUS – All receipts MUST BE turned in immediately to Sherry upon returning to campus. Too many receipts are not being turned in and until the vendor calls looking for payment we do not know that there are outstanding bills to be paid. If this problem continues, our charge privileges with vendors will be in jeopardy

OUT-OF-POCKET CASH PURCHASES – In emergency situations (only) of cash purchases (under \$5), bring the receipt in to Margaret and she will reimburse you. For purchases over \$5, bring the receipt to Sherry and she will process a BPA to reimburse you for the expense (takes 2-3 weeks for your reimbursement).

MSU PURCHASING CARD – **For online ordering and new companies reluctant to charge to the University.** The lab or professor you are working for may have a purchase card for your use. If not, see Sherry. **Document your order:** Print the online pages and make certain the account number to charge is written on your paperwork. **Be sure to include your name and/or the name of the lab or professor you are working for on all documentation.** When you receive your merchandise, turn in the packing slip.

## TRAVEL INFORMATION

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When you are planning to travel, see Brian for instructions and a **Request for Travel** form at least **two weeks before** you travel! Any time you travel on University business (whether or not you will be reimbursed) you must file the proper paperwork before you leave. Providing Request for Travel forms, before you travel, is a requirement to be covered by Workman's Compensation and/or MSU insurance, should you have an accident or the need to file a claim while away from MSU.

1. Complete the *Request for Travel* form. See Brian for blank forms and instructions. Make your own travel arrangements (airfare, rental car, hotel, etc.). Bring a copy of your itinerary with dates (including departure and arrival times), hotel reservations, and all other anticipated expenses to Brian. You may request a travel advance for meals and other expenses.
2. All airfares must be purchased using an MSU credit Card. If the sponsor does not have an MSU credit card, see Sherry to use the department credit card. This is a State of Montana policy. Airfare purchased on a personal credit card may not be reimbursed.
3. You will receive, in your mailbox, the completed form *In-State or Out-of-State Travel Request and Justification*. Review the information carefully and either sign and return the form or notify Brian of any errors. If you request a travel advance, the check should arrive 7-10 days prior to your departure date.
4. During your travel, save receipts for hotels, taxis, and parking. Keep track of any small cash expenses such as buses. As soon as you return, bring in all receipts associated with the trip. Boarding passes, passenger receipt, or ticket stubs are mandatory for all airline travel. It provides proof that you actually took the trip. If the travel was for a conference or workshop, a copy of your name badge or registration receipt is required to show you actually attended.
5. A summary sheet of all expenses for the trip – *Travel Expense Voucher* – will be completed. You will need to review the form to verify all expenses are included for the correct amount. If correct, sign and return. You will receive a check for expenses you paid, less the travel advance (if any).

## COURSE SCHEDULE AND THE GRADUATE COMMITTEE MEMO

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To: New Physics Graduate Students

From: The Graduate Committee

Date: June 4, 2009

1. The normal Fall semester course schedule for a first year graduate student is:
  - a. Physics 500 – Section 01, Teaching Seminar, 1 credit, **required for all new grads.**
  - b. Physics 500 – Section 15, Intro to Research Seminar, 1 credit, **required for all new grads.**

**Note:** Students from the U.S. who are not yet Montana residents must not register formally for either of these seminars, to avoid exceeding the 6-credit limit imposed by the University's residency policy.

- c. Physics 501 – Advanced Classical Mechanics, 3 credits
- d. Physics 566 – Analytical Methods of Mathematical Physics, 3 credits

Total 8 credits

All of these courses are required courses for any degree.

2. The role of the Graduate Committee is to determine:
  - a. Whether you are ready to begin each of these courses
  - b. Whether you should skip either 501 or 566
  - c. Whether you should take any undergraduate courses as preparation for graduate-level courses.

Students with an M.S. degree are expected to choose advanced courses.

3. You may choose an appointment on August 21st from the list of times available to meet with your graduate advisor and discuss your course schedule. See **Margaret** in the front office to set up your appointment.

Your advisor will ask for the following information and would appreciate receiving it in written form:

- a. Texts used in prerequisite courses
- b. Nature and extent of previous courses on these topics
- c. Your ideas regarding your preparation

**Please make a written outline of that information which you can leave with your advisor.**

4. A member of the Graduate Committee (CARLSTEN, Qiu, Cornish, Voronsov, Link) will be assigned as your "Interim Advisor" for Fall Semester. By the beginning of Spring Semester you should have chosen your "research advisor" or "major professor", (this can be changed later if necessary.) Physics 500-15, offered Fall Semester, will introduce you to the faculty and their research programs. You should arrange personal interviews during Fall Semester with faculty members whose research activities interest you. The Advisor who agrees to accept you will then help you form a Thesis Committee. The Division of Graduate Education expects you to have a

“Graduate Program” by Spring Semester also; that is a proposed sequence of courses meeting the degree requirements. The committee program forms are to be completed early in Spring Semester.

5. Please be sure to review the Division of Graduate Education web site entitled “Master’s Requirements” and “Doctoral Requirements”. It is your responsibility to meet the requirements listed there.
6. Forms for “Graduate Programs” may be obtained in the office – see Margaret. Graduate Bulletins may be obtained from the Division of Graduate Education in Room 108 Montana Hall, or can be viewed at <http://www.montana.edu/wwwdg/>.
7. Please read the Physics Department brochure, “**Graduate Manual**”, which you will find in your mailbox here upon your arrival
8. Note that the Division of Graduate Education expects you to maintain a “B” average. A “C” grade in a graduate course is a serious matter (many consider it the equivalent of an “F”).
9. Please give your local address and phone number to Margaret J. as soon as you know it. She can show you your departmental mailbox and your desk assignment.
10. In order to obtain a key to our building, please check your mailbox in the Department for the necessary paperwork and directions.

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## FEE SCHEDULE

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Current Graduate/Post Baccalaureate Fees are found here:

<http://www.montana.edu/wwwcat/expenses/FeeGrad.html>

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## DIVISION OF GRADUATE EDUCATION ONLINE CATALOG INFORMATION

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The **Division of Graduate Education** maintains an online catalog that describes current requirements and policies for the M.S. and Ph.D. programs. Go to: <http://www.montana.edu/wwwdg/> for information on registration, graduate assistantships, transferring credits, petitions and appeals, academic probation and suspension, grades, special courses, pass/fail courses, program and degree requirements, minimum credit requirements, and commencement. **It is your responsibility to acquaint yourself with these policies and requirements.**

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## UNIVERSITY POLICIES & PROCEDURES

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For all other **University Policies & Procedures**, please visit: <http://www2.montana.edu/policy/> Here you will find MSU policies relating to everything from Academic Affairs to Technology Transfer. You are advised to pay particular attention to all policies listed under Student Affairs, and otherwise familiarize yourself with all other policies that are available to you here.

You are strongly encouraged to view the following information with regard to Confidentiality & Privacy Protections: [http://www2.montana.edu/policy/family\\_ed\\_privacy\\_act.htm](http://www2.montana.edu/policy/family_ed_privacy_act.htm)

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## GRADUATE PROGRAMS IN PHYSICS

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The Department of Physics grants the degrees Master of Science and Doctor of Philosophy. The general requirements for these degrees as outlined in the MSU Bulletin apply. Every student should examine this Bulletin and be familiar with its requirements.

The following supplements the Bulletin by outlining requirements and policies which apply specifically to degrees granted by the Department of Physics. In exceptional cases, departmental requirements, prerequisites, and time limits may be adjusted. Such exceptions require consent of the Physics Department Faculty in advance.

First year graduate students are required to register for a Fall Semester 1-credit teaching seminar (PHYS 500-01) and a 1-credit research seminar (PHYS 500-15) designed to acquaint the students with the various research areas in the department. These seminars will be presented by persons active in those areas and are designed to aid a student in identifying the particular area or areas he/she would like to pursue. Students are urged to enroll in other seminars of their choice to obtain more in-depth knowledge of particular areas.

First year U.S. students who are not Montana residents should immediately take steps to become legal residents of the State of Montana, to avoid paying nonresident fees in subsequent years. These students should register for a maximum of 6 credits per semester in their first year.

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## MASTER'S DEGREES

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The Department of Physics grants the Master of Science Degree under two options: Plan A (thesis required), and Plan B (without thesis).

### PLAN A REQUIREMENTS

#### 1. Course Requirements

A minimum of 20 credits of acceptable course work is required, which shall include the following:

Physics 500	Teaching Seminar (see above)	1 credit
Physics 500	Research Introduction Seminar (see above)	1 credit
Physics 501	Advanced Classical Mechanics	3 credits
Physics 506	Quantum Mechanics I	3 credits
Physics 519	Electromagnetic Theory I	3 credits
Physics 566	Mathematical Physics	3 credits
Electives	see comment below	<u>6 credits</u>
		20 credits

#### 2. Thesis Requirements

An acceptable thesis and at least 10 credits of Physics 590 are required.

#### 3. Examinations

A written Comprehensive Examination is required. A Final Oral Examination is also required, covering the thesis and related areas.

## PLAN B REQUIREMENTS

### 1. Course Requirements

A minimum of 30 credits of acceptable course work is required, which shall be distributed as follows:

Physics 500	Teaching Seminar (see above)	1 credit
Physics 500	Research Introduction Seminar (see above)	1 credit
Physics 501	Advanced Classical Mechanics	3 credits
Physics 506 & 507	Quantum Mechanics I & II	6 credits
Physics 519 & 520	Electromagnetic Theory I & II	6 credits
Physics 566	Mathematical Physics	3 credits
Electives	see comment below	<u>10 credits</u>
		30 credits

### 2. Thesis Requirements – None

### 3. Examinations

A written Comprehensive Examination is required.

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## DOCTORAL DEGREE

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### 1. Course Requirements

A minimum of 40 credits of acceptable course work is required, which shall include the following:

Physics 500	Teaching Seminar (see above)	1 credit
Physics 500	Research Introduction Seminar (see above)	1 credit
Physics 501	Advanced Classical Mechanics	3 credits
Physics 506 & 507	Quantum Mechanics I & II	6 credits
Physics 519 & 520	Electromagnetic Theory I & II	6 credits
Physics 535	Statistical Mechanics	3 credits
Physics 566 & 567	Mathematical Physics	6 credits
Electives	see comment below	<u>14 credits</u>
		40 credits

### 2. Thesis Requirement

An acceptable thesis is required. A minimum of 20 credits of Physics 690 is required in addition to the courses listed above.

### 3. Examinations

Written and oral Comprehensive Examinations are required as is a Final Oral Examination covering the thesis and related areas.

## ELECTIVES

All elective courses must be approved by the student's Graduate Committee and the Physics Department Head. This approval will ensure that the electives represent a coherent block of study of substantial relevance to Physics.

The following limitations normally apply to Elective Courses which may be listed on the Graduate Program for the M.S. or Ph.D. degree in Physics:

- A. No more than half of the Elective credits in the above Course Requirements may be at the 400 level in a student's Graduate Program for any graduate degree in Physics. The remaining Elective credits must be at the 500 level.
- B. The Electives will include courses in Physics and minor or supporting fields. At least half of the elective credits must be in Physics.
- C. Physics 400, 411, 470, 489, 490, 589, 590, 689, 690 cannot be used as Electives in any Physics Graduate Program.
- D. Physics 570 is allowed as an Elective to a maximum of 3 credits for an M.S. Program and 6 credits for a Ph.D. Program.
- E. No more than 2 credits of non-required seminar courses are applicable as Electives in any Physics Graduate Program.

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## GRADUATE EXAMINATIONS

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One **written** examination is given every year in the last half of August. It serves both as the M.S. Comprehensive Examination and as part of the Ph.D. Comprehensive Examination. The Ph.D. Comprehensive Examination also includes an oral examination. A Final Examination on the thesis and related topics is required for the Plan A M.S. and Ph.D. degrees.

All students must take the written examination within one year of entering. The results of the written examination may be applied to both the M.S. and Ph.D. programs. The written examination may be repeated once, the next time it is offered. Students must select an M.S. or Ph.D. committee and file the appropriate program form during the Spring Semester before taking this examination. Note: Students admitted to the Ph.D. program, who wish to receive the M.S. degree en route to the Ph.D., must inform the Department immediately after arriving on campus. They must select an M.S. committee before taking the written examination, and a Ph.D. committee during the semester in which they apply for the M.S. degree.

Postponement of the written examination is granted only in exceptional cases. Requests for postponement must be submitted to the Graduate Committee no later than April 1 by both the student and the advisor.

For both the Ph.D. and Plan A M.S. degrees, a final **oral** examination is conducted by the student's Graduate Committee. This examination takes place after the thesis has been submitted and covers the thesis and related topics.

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### M.S. COMPREHENSIVE EXAMINATION

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A student attempting to obtain the M.S. degree is allowed two attempts to pass this written examination at the M.S. Comprehensive level.

A student who has passed the Ph.D. written Comprehensive Examination will be deemed to have passed the M.S. Comprehensive Examination.

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### PH.D. COMPREHENSIVE EXAMINATION

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The written and oral portions of the Ph.D. Comprehensive Examination are considered separate examinations, and each must be passed separately.

The physics written comprehensive exam is a test of physics principles and their applications. It is a test of principles of broad utility which any practicing Physicist must know and be able to apply. The written examination consists of fifteen problems, each about an hour in length, drawn from typical undergraduate course work and from our first-year graduate core courses, namely quantum mechanics, electricity and magnetism, classical mechanics, and mathematical methods.

The oral portion of the Ph.D. Comprehensive Examination will be administered by the student's Ph.D. committee. **Students not pursuing an M.S. degree en route to the Ph.D. must take the oral examination by October 1, after the written examination is passed.** Students pursuing the M.S. degree en route to the Ph.D. must take the oral examination during their first semester in the Ph.D. program, normally within one year after passing the written examination. The student's Ph.D. Committee must approve the topic for a short talk to be presented by the student at the beginning of the oral portion of the Ph.D. Comprehensive Examination. The topic, which must be new to the student, should be determined by the student and approved by the committee as early as possible after the written exam is passed, to insure adequate time for the student to study and prepare for the oral exam. The talk will be followed by questions on the talk and other topics. Committee members and the Graduate Representative appointed by The Division of Graduate Education must participate in the oral examination. If failed, the oral examination may be repeated once, six to nine months later.

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### PHYSICS DEPARTMENT FINANCIAL AID GUIDELINES

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Most students admitted to advanced degree programs in the Physics Department are awarded financial aid, in the form of research and teaching assistantships, fellowships, and fee waivers. To receive financial aid, a student must satisfy the requirements of the Division of Graduate Education listed in the Graduate Bulletin, as well as requirements of the Physics Department given below. Satisfaction of these requirements does not guarantee financial aid, although it is the policy of the Physics Department to support as many qualified graduate students as permitted by the available resources. Limited financial assistance is offered in the summer. For foreign students, continuation of financial aid beyond the first year is contingent upon satisfactory performance in spoken English.

## CREDIT REQUIREMENTS

Students receiving financial aid must be registered for a minimum of 9 credits during the academic year. Exception: during the first year of residence, domestic students may register for 6 credits in order to earn state residency.

## GRADE REQUIREMENTS

Financial aid may be revoked if a student's cumulative grade point average (GPA) falls below 3.0; graduate standing may also be removed in this case (see the Graduate Bulletin).

[http://www.montana.edu/wwwdg/cat\\_grades\\_courses.shtml](http://www.montana.edu/wwwdg/cat_grades_courses.shtml)

## M.S. CANDIDATES

Candidates for the degree of M.S. in Physics will generally be granted a maximum of two years of financial aid including summers. Note that all specific course requirements for this degree can be satisfied in one year. Exception: students selecting the Plan A (thesis) option may apply for research assistantships for up to one academic year beyond the second year of study; generally, teaching assistantships will not be awarded after the second year.

## P.h.D. CANDIDATES

Financial aid will be continued beyond two years only if the written Ph.D. Comprehensive Exam is passed at the Ph.D. level by the second attempt.

**MANDATORY ANNUAL MEETINGS WITH THE GRADUATE COMMITTEE** The Department of Physics requires senior graduate students to hold annual meetings with their graduate committee to discuss progress and plans for completing their Ph.D. thesis. These annual meetings are not intended to be along the lines of the oral comprehensive exam, but are simply intended to be a one hour meeting to have the student and committee discuss progress on and plans for the thesis project. The meetings will also serve as a regular source of input from other members of the committee. The annual meetings are encouraged once a student joins a research group and has formed a Ph.D. committee, but become mandatory beginning with the Spring term of the student's fourth year in the program, that is prior to the student starting his/her 5<sup>th</sup> year. The student is responsible for scheduling the committee meeting. Attendance of the grad rep at the meeting is desired but not required. Attendance at the meeting for the two nonreaders on the committee is desired but not required. The three readers are required to attend the meeting, or an appropriate substitute found in rare conflicted cases. The grad student will discuss the planned timeline and progress on the thesis at the meeting. After the meeting, the thesis advisor will submit a summary letter to the department head, with copies to the student and other members of the committee, prior to the end of that spring semester. Failure to do this will delay initiation of the GTA or GRA appointment for the following Fall term. Questions regarding this policy should be brought to the Department Head.

**TIME RESTRICTION FOR GTA SUPPORT** This time restriction would apply to the ninth year after the student enters the program. For example, if a student enters the program in fall 2009, a time restriction would apply to GTA support for the fall semester of 2017. The department will normally not give GTA support to students beyond their eighth year in the graduate program. To request GTA support for semesters after the eighth year would require a letter from the graduate advisor to the department head describing the circumstances that justify the continued GTA support for the student. Moreover, the student could continue on GRA support or personal funds. Our hope is that the mandated annual meetings of the student and his/her committee will mean that the restriction on GTA support rarely comes into play. Questions regarding this policy should be brought to the Department Head.

## FLOW CHART: MASTER'S ENROUTE TO PH.D

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## POLICIES REGARDING APPLICABILITY OF COURSES TO PROGRAM

The table below briefly outlines the policies regarding this Program of Study. More comprehensive descriptions regarding all of these policies may be found in the Graduate section of the online Graduate Catalog

Masters: [http://www.montana.edu/wwwdg/cat\\_for\\_masters\\_stud.shtml](http://www.montana.edu/wwwdg/cat_for_masters_stud.shtml)

Doctoral: [http://www.montana.edu/wwwdg/cat\\_for\\_doc\\_stud.shtml](http://www.montana.edu/wwwdg/cat_for_doc_stud.shtml)

<i><b>Master's Degree</b></i>	<i><b>Doctoral Degree</b></i>
30 credits (min) for most master's degrees or the minimum required for the degree. <i>"A"</i> Plan requires: 10 credits (min) thesis ½ of total credits required for degree must be at 5xx level <i>"B"</i> Plan requires: 15 credits (min) 5xx level	20 credits (min) dissertation (14 for Ed.D.) 40 credits minimum total (which are applicable to degree)  * Dept may have more stringent requirements
Pass/Fail – max of 3 credits allowed (excluding thesis)	Pass/Fail – max of 9 credits allowed (excluding dissertation)
400, 470, 476, 489, 490, 588 & 589 courses not allowed on program	400, 470, 476, 489, 490, 588 & 589 courses not allowed on program
570 – max of 4 credits ( <i>"A"</i> Plan), 6 credits ( <i>"B"</i> Plan)	570 – max of 6 credits
500, 570, 576 ( <i>including dept practicums</i> ) – may not exceed 1/3 credits required for degree	500, 570, 576 ( <i>including dept practicums</i> ) – may not exceed 1/3 credits required for degree
575–max of 6 credits (575 credits are for plan <i>"B"</i> students only)	575 credits are not allowed on doctoral programs
Non-Degree/Reserved credit – max of 6 to 9 credits allowed depending upon admissibility at the time the courses(s) were taken <b>(See graduate catalog)</b>	Non-Degree/Reserved credit – max of 6 to 9 credits allowed depending upon admissibility at the time the courses(s) were taken <b>(See graduate catalog)</b>
Course work may not be more than six (6) years old at time of graduation	Course work may not be more than ten (10) years old at time of graduation
Transfer Credit – may not exceed 1/3 total credits on program	Transfer Credit – may not exceed 1/3 total credits on program
Grade Performance for courses on Program of Study: Grades below <i>"C-</i> " must be repeated <i>"I"</i> grades must be resolved before graduation	Grade Performance for courses on Program of Study: Grades below <i>"C-</i> " must be repeated <i>"I"</i> grades must be resolved before graduation
3 credits (min) <b>Registrar Registration</b> required during term of comprehensive exams, defense of thesis, and graduation	3 credits (min) <b>Registrar Registration</b> required during term of comprehensive exams, defense of thesis, and graduation
3 credits (min) <b>Registrar Registration</b> required for continuous enrollment. Continuous enrollment applies to all master's students who have passed a comprehensive examination <b>or</b> students who have completed program content coursework (excludes thesis credits).	3 credits (min) <b>Registrar Registration</b> required for continuous enrollment. Continuous enrollment applies to all doctoral students once student has passed comprehensive examination.

## SUMMER SUPPORT

Summer support is not guaranteed, although we will fill as many requests as we can. It is up to individual students to coordinate summer Graduate Research Assistantships with their advisors or with other faculty.

## SUMMER LECTURESHIPS

Early in the spring semester, graduate students will be invited to apply for summer lectureships by submitting applications to the Department Head. Applications must include a description of teaching experience, courses desired, qualifications to teach the requested courses, and references. Lectureships will be assigned by the Personnel and Policy Committee. Preference will be given to current graduate students who meet appropriate

standards of knowledge, experience, and ability. GTAs will also be assigned grading and laboratory duties, later in the spring semester.

The activities below are appropriate for inclusion in the applicant's teaching resume, as well as any other activity which contributes substantially to the department's teaching mission.

Graduate students are encouraged to

- Sit in on lectures during the AY
- Volunteer for Learning Center duty
- Go beyond the norm while leading lab sections. Examples of such activities: producing special handouts in areas of difficulty; holding special help sessions with individual students or groups of students from the lab section; or engaging in any other activity that reaches out to students and demonstrates a strong interest in teaching

Faculty members are encouraged to

- Provide lecturing or team teaching opportunities for qualified students in regular courses; students normally take the initiative, and faculty may decline
- Invite qualified TAs to lead *ad hoc* help sessions

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### MINIMUM ENROLLMENT POLICIES

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Graduate students with a Research Assistantship or Teaching Assistantship must be registered for 9 credits during Fall and Spring terms. RAs and TAs must be registered for *at least* one credit during Summer term if they have not passed any portion of the comprehensive exams. Any graduate student being granted a degree in Summer term must be registered for 3 credits. If you need further clarification, refer to the on-line graduate catalog.

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### CONTINUOUS ENROLLMENT POLICIES

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Students (RAs, TAs & self-supporting individuals) that have passed *any portion* of our comprehensive exams must be registered for a minimum of 3 credits during the Summer term. Only self-supporting students that haven't passed any portion of the comps are exempt from taking any credits during the Summer. If you need further clarification, refer to the on-line graduate catalog.

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### PHYSICS DEPARTMENT POLICY ON CHEATING AND PLAGIARISM

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- A. Any work submitted by students must be their own. They are not allowed to copy someone else's work or paraphrase another student's paper or exam and submit it as their own. Any work that is someone else's must be clearly identified as such with credit given. In the case of collaborative work, it is certainly permissible to have appropriate interactions; however, unless instructions explicitly state otherwise, students will prepare their own separate and individual exams, reports, or papers. Under no circumstances are take-home exams collaborative, and, during the take-home time frame, there will be no discussion of the exam questions with anyone other than the instructor.
- B. All students involved in the violation of this policy will be treated equally.
- C. In the case of laboratories where groups do experiments and take data together, students are to keep their own lab notebooks and prepare their own lab analysis and reports. Lab notebooks are not to be shared; particularly, data are not to be given to students who did not participate in the experiment.
- D. The instructor will discuss violations of this policy with the student(s) and the Department Head and then will inform the student in writing of the charge and state the evidence. A copy will go to the Dean of Students for the student record. Any student found in violation of this policy will be given, as a minimum

penalty, a “0” on that piece of work. A second violation will lead to an “F” in the course. A student may appeal. Procedures are found in the pamphlet entitled, “Student Academic and Conduct Guidelines and Grievance Procedures,” available from the Dean of Students Office.

- E. GTA’s will bring cheating matters to the Professor in charge of the course who will then implement this policy.
- F. Whenever possible, student work to be used for evaluative purposes should be done in class or lab or some other controlled environment.

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## PHYSICS DEPARTMENT PHOTOCOPYING POLICY

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### FACULTY

- DEPARTMENT WILL PAY FOR anything related to teaching assignments.
- GRANTS WILL PAY FOR anything related to research.

### GRADUATE STUDENTS

- DEPARTMENT WILL PAY FOR anything related to teaching assignments (GTAs only).
- ANYTHING ELSE (course notes, course work, theses, etc.) is considered personal.
- PERSONAL COPIES are 7¢ each.

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## OFFICE SUPPLIES

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### Transparencies

Any grad student enrolled in one (or more) of our SEMINARS may use the high-quality, copier transparencies (specific to, and must be run through the copier) free of charge **for presentations given during that seminar**. See Margaret for them. Please note that you may PURCHASE these transparencies for other CLASSES you are attending. Research groups and labs are still required to purchase the transparencies (by the box) in the front office. The inexpensive (hand-written) transparencies are still available for your use as well – they are free.

### Miscellaneous Supplies

Students that are **teaching or grading** may use pens, paper, dry erase markers, etc. for their use during these tasks. Please provide your own supplies for personal course work.

## MSU RESIDENCY POLICY SUMMARY

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### Board of Regents' Residency Policy: Summary and Instructions

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*Note: the following statements have been summarized from the original document, "Student Guide to Residency Policy: Montana University System", as published by the Montana Board of Regents of Higher Education. The student is encouraged to review the entire document, which may be obtained from the Registrar's Office, Montana State University.*

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A person who is considered a non-resident for tuition purposes may be reclassified as a resident when the following conditions have been met:

1. A person must be physically present in Montana for **12 continuous months**. A total of 30 days absence from the state is allowed during the 12-month period.
2. The 12-month period does not begin until at least one act that clearly indicates the intent to become a Montana resident is taken. *Physical presence in Montana alone will not serve to start this period.* The legal starting action must occur in the preceding year, **on or before the 15<sup>th</sup> class day** of the term for which reclassification is requested. You are expected to act in a manner consistent with Montana residence, and do all those things required by law of a Montana resident. **Sufficient acts to begin the period are:**
  - a. A Montana vehicle registration is obtained (*Note: if you are employed, Montana law requires that you register any vehicle you own or operate, even if your name is not on the title, i.e. parent's vehicle.*)
  - b. A Montana driver's license is acquired.
  - c. A Montana voter registration is acquired.
  - d. A principal residence (house or mobile home) is purchased and a MT title obtained.
  - e. A resident Montana income tax return is filed.
  - f. Only if items a-e do not apply, an Affidavit of Intent can be filed.

**An individual who is enrolled for more than half-time status at a post-secondary school during any semester that falls within the 12-month period is presumed to be present in the state primarily for educational purposes, and such periods will not generally be considered as part of the 12-month period of the policy. At Montana State University, 6 credits is considered half-time enrollment status for both undergraduate and graduate students.**

A person seeking resident status must demonstrate that as an independent person, he/she is at least 51% financially independent, and that he/she is **not claimed** as an exemption by a **non-resident parent** or legal guardian on federal income taxes, commencing with the tax year in which the 12-month period begins.

During the 12-month period and thereafter, an individual is expected to act in a manner consistent with Montana residency and do all those things required by law of any resident. Examples of inconsistent or contradictory actions are voting absentee ballot in another state, receiving financial benefits from another state based on residence, maintaining legal ties with another state, participation in an exchange program such as the Western Undergraduate Exchange (WUE) or National Student Exchange (NSE) that affect fee status, or receiving financial aid/scholarships based on residence other than Montana.

#### Special Circumstances and/or Exemptions to the Policy:

- A minor or un-emancipated person may be considered a resident if:
  - a. The student normally resides with a parent who is a resident of Montana,

- b. If the parent who takes the student as an exemption for federal income tax purposes, or supplies the majority of their financial support (51%), is a Montana resident.
- A person who is absent from Montana in excess of a total of 30 days during the 12-month period is presumed to lack the necessary intent to acquire MT residency, and will remain classified as a non-resident. He/she may begin another 12-month period of continuous physical presence upon their return to Montana.
  - Time spent in prison or city/county jails does not satisfy the 12-month residency requirements unless the individual had taken acts to establish the intent to become a Montana resident prior to incarceration.
  - Members of the armed forces stationed in Montana on regular active duty, their spouse, and dependent children will be classified as residents during the tour of duty. This does **not** include service in the Montana National Guard and/or Reserve Units unless full-time, active duty status can be proven.
  - A person domiciled in Montana who is employed in a **permanent, full-time job**, his/her spouse, and dependent children are considered residents of Montana without fulfilling the 12-month period, if demonstrated proof can be provided that the primary purpose for the move to Montana was not education, and that all legal ties have been changed to Montana, i.e. driver's licenses, vehicle and voter registrations, etc. This exemption to the 12-month period is based upon a permanent, full-time job offer and acceptance of that offer prior to the individual's move to Montana, or the submission of any Application for Admissions materials to a college or university in the state.
  - Any graduate of a Montana high school accredited by the Board of Public Education who is a citizen of the U.S. or a Permanent Resident Alien, who registers at any unit (college) of the Montana University System no later than the 4<sup>th</sup> fall term following the student's high school graduation shall be eligible for in-state fee status for five years from the date of initial registration or until the achievement of a baccalaureate degree, whichever occurs first, provided that the individual attended the Montana high school for the entire senior year.
  - It is presumed that an individual who was formerly eligible for in-state fee status who has been absent from Montana for a period of 12 months or more, has abandoned in-state status. This presumption does not apply to individuals who can demonstrate that Montana residence was maintained during the absence, and no actions were taken in contradiction of the claim of Montana residence. Examples of such evidence would be: maintaining legal ties with Montana, i.e. driver's license, voter registration/voting absentee ballot, vehicle registration, and the filing of full-year resident Montana income tax returns on all income earned. This presumption of non-residence does not apply to individuals who left the state solely for educational purposes or for military service, provided the individual did nothing to contradict Montana residence status. If contradictory actions are taken, the individual could lose Montana resident status for fee purposes immediately, e.g. employment in another state, legal ties changed to another state, and/or filing resident income tax returns in an state other than Montana.

To Petition for in-state classification of residency/fee status, a student must submit the questionnaire found in the Board of Regents' Residency Policy Pamphlet, with appropriate documentation of answers (see handout titled: Documentation to Accompany Residency Petition) by the prescribed deadlines. For further information on the residency policy, petition deadlines or questions on issues not described in this summary:

- New undergraduate applicants or prospective students, contact Enrollment Services at [enrollmentservices@montana.edu](mailto:enrollmentservices@montana.edu), or call 406-994-6617.
- New graduate applicants or prospective students, contact the Division of Graduate Education at [kgill@montana.edu](mailto:kgill@montana.edu) or call 406-994-4145.
- Continuing or returning former students contact the Registrar's Office at [bashley@montana.edu](mailto:bashley@montana.edu) or call 406-994-6650.

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