



1999 Fusion Summer Study
**Opportunities and Directions in
Fusion Energy Science for the Next Decade**

An Endorsed Workshop of
**The American Physical Society and
The American Nuclear Society – Fusion Energy Division**
July 11-23, 1999 at Snowmass, CO

Second Bulletin
June 24, 1999

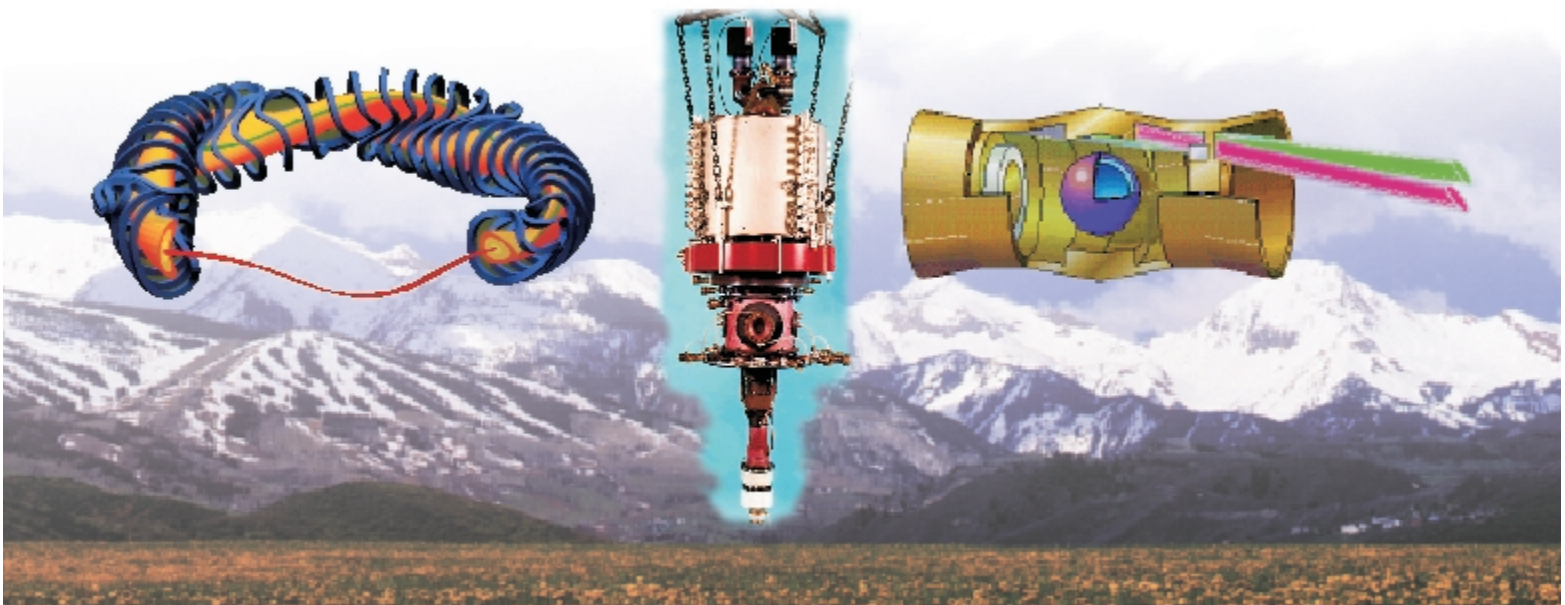
The level of participation in the 1999 Summer Study has been gratifying. In three weeks, over 300 individuals from 12 countries will be arriving in the Colorado mountains for a Workshop we expect to be exceptionally productive. Important arrival information may be found in this *Bulletin* along with schedules for the opening plenary talks on Monday, July 12, and the working group activities which begin Tuesday morning on July 13.

Organization

The 1999 Fusion Summer Study follows a format adapted from the series of Summer Studies undertaken by the APS-DPF to evaluate options for the future course of U. S. high energy physics research. These Summer Studies proved invaluable in drawing the high energy physics community together, and it is our hope that fusion's Summer Study at Snowmass will have the same effect while developing a scientific and technical basis for consensus on the key issues and opportunities for fusion energy science in the next decade. The Workshop will start with a day of plenary talks. After that, participants will form working groups and subgroups which will be led by one or more conveners and session leaders. These conveners will summarize the findings of their respective working groups in the final plenary sessions on July 22 and 23. A *Proceedings* of the Workshop will be prepared and distributed on CD-ROM. A list of the conveners, as well as tentative plans and schedules for the working groups, are available on the Workshop's web page at:

<http://www.pppl.gov/snowmass>

Our web pages contain essential information about the Workshop. We encourage all participants to review our web pages prior to arriving at Snowmass. If you have difficulty obtaining Snowmass information the web, please send e-mail to John De Looper (jdeloope@pppl.gov) requesting assistance.



Introduction to Snowmass

Snowmass Village is located in the snow-capped Rockies between 8000 and 9000 feet and 10 miles from Aspen. Founded in 1962 as a winter ski resort, Snowmass in the off-season summer months provides an affordable location for our Summer Study. The weather in July will be a humidity-free 70-85 °F during the day, but it can get quite cool in the evenings. Fusion scientists have reserved lodging at 10 different properties located throughout the Village. The central Village Mall can be reached from any location by a ten-minute walk or a free shuttle bus.

We are very pleased with the registration for the Workshop. Our Summer Study will benefit from wide representation from the fusion energy science community. However, registration is nearly twice as large as originally planned, and we have had to seek inventive ways to accommodate the need for many parallel meeting rooms. Working group activities are organized into the several subtropical discussion sessions. These will be located in more than 16 different meeting rooms, village store fronts, tents, and condos. Each meeting space will be comfortable, but, from time-to-time, we ask you to be prepared to squeeze a few extra participants into a room. Registration, our large plenary sessions, and our daily social hours will be in the Roof-Top-Garden or the meeting rooms located in the Conference Center. Smaller working group discussion sessions will be located throughout the Village at the Top of the Village, the Mountain Chalet, the Stonebridge Inn, the Crestwood, the Enclave, the Woodrun, the Chamonix, and two tents. A Snowmass map is attached to the end of this Bulletin. Specific meeting room assignments will be provided in your registration materials when you arrive at Snowmass, and updated schedules will be posted at each lodging property.

Every effort has been made to insure that your stay at Snowmass will be amiable and conducive for your contributions to the Fusion Summer Study. This *Bulletin* attempts to provide useful information and to address potential questions that participants may have. Some of these items are of vital importance for your health and/or for your safe travel to Snowmass. [These items are designated in “blue” letters, and we ask that you please review these items before you arrive at Snowmass.](#)

Registration

Participants should formally register with the Workshop after they have checked into their condominiums or hotels. Registration desks will be open from 1:00 – 6:00 PM on Sunday, July 11, in the Snobble Room of the Convention Center. For those not arriving by Sunday, please register at the Workshop office.

The originally suggested \$100 service fee has been reduced to \$70.00 for those staying more than one week and \$35.00 for those staying less than one week. The service fee is necessary to cover the costs of coffee breaks, receptions and social hours. (This service fee is considered part of your *per diem* meal expenses, and it can not be reimbursed separately.) The service fee does not cover any recreational costs. These will be arranged individually, and they are non-allowable costs for government funds. All participants of the Fusion Summer Study should come prepared with a personal check to pay the service fee at time of registration.

Poster Boards

Near the registration area, in the lobby of the convention center and in the Roof-Top-Garden tent, each Working Group will display poster boards and information tables containing papers, ideas, schedules, and issues for consideration by other participants.

Opening Plenary Session (Monday, July 12, 1999)

Plenary sessions will be held at the Roof-Top-Garden located at the top of the Snowmass Conference Center on the Snowmass Mall. The program for the opening plenary is:

8:30 AM	<i>M. Mauel</i>	<i>(Welcome)</i>
9:00 AM	H. Grunder	
9:30 AM	M. Rosenbluth	
10:00 AM	F. Wagner	
10:30 AM	<i>Break</i>	
11:00 AM	M. Kikuchi	
11:30 AM	R. Conn	
12:00 PM	D. Ryutov	
12:30 PM	<i>Lunch</i>	
2:00 PM	D. Baldwin	
2:30 PM	M. Campbell	
3:00 PM	R. Goldston	
3:30 PM	<i>Break</i>	
4:00 PM	T. Taylor	<i>(Magnetic Fusion Concepts)</i>
4:15 PM	C. Olson	<i>(Inertial Fusion Concepts)</i>
4:30 PM	D. Barnes	<i>(Emerging Fusion Concepts)</i>
4:45 PM	A. Kritz	<i>(Plasma Science Issues)</i>
5:00 PM	M. Abdou	<i>(Technology Issues)</i>
5:15 PM	F. Najmabadi	<i>(Energy Issues)</i>

At the end of the day, our social hour will begin at 5:45 PM, allowing time for informal scientific and technical interactions. During this time, poster boards from each Working Group will display details of the week’s agenda and discussion topics.

Workshop Office

The Workshop Office will be located in the Silvertree Hotel, directly across from the convention center. You can reach the office without going into the hotel. It will be equipped with copying machines, transparency making equipment, and a telefax machine. The telephone number for the telefax will be posted on our Summer Study Web site shortly, and it will also be provided in the registration materials. Special arrangements may be made at the Workshop Office to do after-hour copying.

Mailing Address

The mailing address for incoming mail (including Federal Express) is:

c/o Fusion Summer Workshop
 SilverTree Hotel
 100 Elbert Lane
 Snowmass Village, CO 81615
 Phone: 970-923-3520

Mail and packages will be held in the Workshop Office. A message board will be located in the Roof-Top-Garden to notify you of mail and messages.

Proceedings

The *Proceedings* of the meeting will be published on CD-ROM and on the world wide web. The *Proceedings* will consist of summary reports from the working group convenors, technical reports from the subtopical groups authored by the contributing participants of each subgroup, and contributed reports from individuals or groups. Further details can be found on the Summer Study Web site. Submissions for inclusion must be submitted to the organizers via the working group leaders no later than September 10, 1999 to be included.

Computing

Access to remote computing resources along with local printing will be provided at Snowmass. The Computer Center for the Fusion Summer Study will be open 24 hours per day from noon on July 11 to noon on Friday, July 23. A Snowmass name-tag will be necessary to use the facilities (and a security guard will check).

The computer center will have T-1 access to the internet and six dedicated phone lines for direct 56k modem connections to other computer resources. The center will have eight Macintosh platforms (e.g. Desktop G3 233; 64 MB RAM; 4GB HD; NIC Card; CD ROM; zip drive; 15 inch monitor) and seven PC platforms (e.g., Desktop PII 300; 64 MB RAM; 4GB HD; NIC Card; CD ROM; zip drive; 15 inch monitor). Each computer will have the latest edition of Eudora Pro, Microsoft Office, Netscape Communicator, Claris Draw, Norton Anti-virus, NCSA Telnet, and X-terminal emulation (eXodus on Mac, X-onet on PC). One color and two black-and-white laser printers will be available.

All lodging options at Snowmass have phones for modem connections. The local Earthlink V.90, K56, V.34 access number is 970-544-2401.

Transportation

Access by Air

Snowmass Village is located at an altitude of nearly 3,000 m in the Rocky Mountains of Colorado, accessible via Denver's International Airport with connecting flights directly into the Aspen Colorado Airport, about six miles from the Village. The Aspen Colorado Airport is the preferred destination point for Snowmass Village. (Alternately, you may fly into Denver and then take a shuttle bus to the Aspen Airport. Although rental cars are available, you should not need a rental car to get to or around Snowmass.) [There are a limited number of flights into the Aspen Colorado Airport. If you have not made your flight reservations, we suggest that you do so immediately.](#) The primary airline into the Aspen, Colorado Airport is United Express with connections to the Denver Airport. Other airlines include America West with service to Phoenix, Arizona and Northwest with service to Minneapolis, Minnesota.

From Denver, take Airport Shuttle of Colorado, telephone 800-222-2112. The cost is \$69.00 per person one way. This van departs daily at 9:30 a.m. and 12:30 p.m. Reservations should be made 48 hours in advance and prepaid. It takes approximately 4 hours for the trip with two 10-15 minute stops along the way (Vail and Glenwood Springs). Unless there are at least five people going to the same location in Snowmass, the van will make its last stop at the Aspen Airport.

From Aspen Airport, Airport Shuttle of Colorado, offers a curbside service and meets all incoming flights. The cost of this shuttle service is between \$6.00 and \$18.00 per person, one way, depending on the number of passengers in the van.

In addition, courtesy transportation between Aspen Airport and your place of lodging is generally available on the day of your arrival and departure. When you arrive at the Aspen Airport, you should call one of the following numbers to arrange for pickup:

Aspenwood Condominiums	970-923-2711
Chamonix Condominiums	970-923-5543
Crestwood Condominiums	970-923-2450
Enclave Condominiums	970-923-4601
Laurelwood Condominiums	970-923-3110
Mountain Chalet	970-923-3900
Silvertree Hotel	970-923-3520
Stonebridge Condominiums	970-923-4323
Terracehouse Condominiums	970-923-4350
Timberline Condominiums	970-923-4000 (call ahead)
Top of the Village Condominiums	970-923-3673 (call ahead)
Wildwood Lodge	970-923-3550
Woodrun Place Condominiums	970-923-5392

Timberline and Top-of-the-Village would appreciate at least a one-day advance notice so sufficient transportation arrangements can be made. Remember, when you arrive at the Aspen Airport, you must call to request a courtesy van.

Access by Car

The easiest access by car is via Interstate Highway US 70 and Highway CO 82 from Glenwood Springs. The road to Snowmass Village turns off CO 82 to the west, some 8 miles north of Aspen. Follow the road all around the resort to your place of lodging.

Local Transportation

Free shuttle service operates continuously around the Snowmass Village from about 7:45 a.m. to 8:00 p.m. A county bus service to and from Aspen operates daily between 7:15 a.m. and 11:30 p.m. For exact times, check the bus schedule posted at the Snowmass Mall. Cost of the county bus to Aspen is \$2.00. This bus also operates near the airport, across Highway 82, but they only allow carry-on luggage.

Rental Cars

Most major rental car agencies are located at both Aspen and Denver Airports. You should not require rental cars while at the Fusion Summer Study. Nationwide Toll-Free Reservations and their Aspen numbers are as follows:

Avis	800-831-2847	(970-925-2355)
Budget	800-527-0700	(970-925-2151)
Hertz	800-654-3131	(970-925-7368)
Thrifty	800-367-2277	(970-920-2305)

Parking at Snowmass Village:

Parking lots are located across from each of the major facilities. See map enclosed. Cars illegally parked will be towed at the owner's expense.

Personal Safety

Weather

Please remember that although the days in the mountains are generally warm and sunny, the evenings can be quite cool. In addition, the Colorado mountains are known for their frequent afternoon rain and thunder showers. Please pack accordingly; an umbrella or poncho is recommended.

Altitude

Since Snowmass Village is located in the Rockies between 8000 and 9000 feet, it is suggested that individuals consume sufficient water, especially for the first week due to the elevation. Sunscreen and hats are also recommended due to the elevation.

Dress

The dress for the Fusion Summer Study will be casual. Ties and jackets are discouraged.

Emergencies

Dial 911 for emergencies. Snowmass Village has ambulance, fire and police services. For family members trying to contact you, they should call the lodging facility that you are staying and leave a message at the desk.

Medical Care

Each lodging facility has a list of doctors, dentists and medical facilities in the Snowmass and Aspen areas.

Accommodations

If you haven't already arranged for lodging, you must immediately contact the Snowmass Resort Association by phoning 800-598-2004 or Telefaxing 970-923-4260. If you have made reservations but have not received a written confirmation, please call the Snowmass Resort Association at the above number to verify that they did receive your reservation.

Check-In Procedures

During regular business hours, check in is at the office of the individual condominium or hotel in which you are staying. In the case of Top of the Village accommodations, the housing registration desk is located in the Gatehouse. Late arrivals will find their keys either on a rack outside the condominium office door or on its front desk. These keys will be clearly labeled by name and unit.

Condominium Furnishings

Since each unit is individually owned, the decor and furnishings will vary. However, every unit will have linens and a good assortment of cooking utensils. Maid service varies from property to property.

Telephones

All rooms and rental units are equipped with telephones, and local V.90 K56 modem service is available. Some properties require fees for local calls. For long distance calls the use of a credit card (or collect charge arrangements) is mandatory. Please come prepared.

Pets

Absolutely no pets are allowed in the condominium units.

Recycling

Snowmass now has facilities available to recycle aluminum cans, paper, and glass. Top of the Village will provide special receptacles for these items on the lower garage level of each building by the waste receptacles. PLEASE USE THEM. All of the other properties, will remove these items if they are kept separated from trash and clearly marked for recycling. Please check with your property upon arrival to find out their recycling policy.

Payment of Lodging Bill

Every property sets its own policy with regard to settlement of lodging accounts. You are responsible for the payment of your lodging bill. Most, **but not all**, properties accept major credit cards, and we recommended that you check with your property in advance about their settlement policy.

General Information

Banking Services

The Alpine Bank of Snowmass (970-923-3600) has two facilities, one in the Snowmass Mall (970-923-4931) and the other at the Snowmass Center (by the Conoco Station). Automatic Teller Machines (ATMs) are located at several locations in the Village.

Food Market

A food market is located at the base of Snowmass in the Village Center.

Daycare

Camp Snowmass (800-525-6200, Ext. 4570), located in the Snowmass Mall, provides care for children 3 through 12 at a rate of \$45 per day, \$35 per day for 10 days or more. Baby sitting service is available through Super Sitters (970-923-6080). These are bonded baby sitters, but they are quite expensive.

Snowmass Resort Association maintains a list of available baby sitters, and we are trying to put together a list of participants' children who are interested in baby sitting. These lists will be available at the Workshop Office. (The cost of baby sitting is not allowed for government reimbursement.)

Social Program

Several social events are being planned for participants and their families. Details of these events will be provided in your registration materials. (The costs of social activities are not allowed for government reimbursement.)

Companion and Family Programs

During Sunday's Registration, and at other times by request. members of the Village Concierge will be present to provide you with information on various activities available in the Aspen-Snowmass area. Activities include mountain bicycle rentals (with chair-lifts to the Snowmass ridge!), white-water rafting, jeep trips, horseback riding, and free concerts. To help coordinate joint activities among fusion spouses and companions, a listing of tours, and other events will be available to sign up for during registration and at other times.

Welcome Reception

A Welcome Reception will be held on Sunday evening, July 11, from 6:00 p.m. to 7:30 p.m. in the Anderson of the Conference Center. All participants are invited to attend. Light finger food and soft drinks will be served.

Rodeo

Participants are encouraged to attend the rodeo including a Barbecue on Wednesday, July 14 as a group Fusion Summer Study event. The cost will be \$28 for the Barbecue and Rodeo (transportation to and from the hotels will be provided). Prices will be \$14 for children under 10 and \$9 for children under 5.

Fusion Skit

A special treat will be provided during the July 16 reception when a skit will be performed by several members of the community.

Saturday's Excursion: Fusion to the "Top"

On Saturday July 17, all participants and companions of the Fusion Summer Study are encouraged to use the chair-lift to go to the "top" and have lunch at "Dudleys on Sam's Knob." This Fusion Summer Study group event will be a relaxing break from our working group activities. Energetic individuals can embark on ridge-top hiking while the rest of us enjoy the view before riding the chair-lift back down to the Village. Dudleys is a restaurant serving various western dishes (a menu will be available during registration).

Group Photo

A group photo of the Fusion Summer Study Participants will be taken on Thursday, July 22, 1999 on the ski slope next to the Silvertree hotel just before the lunch period. Photos will be mailed to participants. If you want a photo (10x14) there will be a \$20 charge payable at the registration desk or the Workshop Office. The photos will be mailed to your office approximately one week after the meeting has concluded.

Farewell Reception

A Farewell Reception will be held on Thursday evening, July 12, from 6:00 p.m. to 7:30 p.m. following the Open Discussion of the Working Group Reports. All participants are invited to attend. Light finger food and soft drinks will be served.

Organizing Committee

Mohamed Abdou	(UCLA)	Dan Barnes	(LANL)
John Cary	(UColorado)	Rich Hawryluk (Co-Chair)	(PPPL)
Arnold Kritz	(Lehigh)	Grant Logan (Co-Chair)	(LLNL)
Mike Mauel (Co-Chair)	(Columbia)	Farrokh Najmabadi	(UCSD)
Craig Olson	(SNL)	Tony Taylor	(GA)

Contact Person

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 Princeton University
 P.O. Box 451
 Princeton, NJ 008543-0451

Working Group Organizers and Convenors

Magnetic Fusion Concepts	Tony Taylor	taylor@gav.gat.com
Inertial Fusion Concepts	Craig Olson	clolson@sandia.gov
Emerging Fusion Concepts	Dan Barnes	dbarnes@penning.lanl.gov
Plasma Science Issues	Arnold Kritz / John Cary	kritz@plasma.physics.lehigh.edu cary@boulder.colorado.edu
Technology Issues	Mohamed Abdou	abdou@fusion.ucla.edu
Energy Issues	Farrokh Najmabadi	najmabadi@fusion.ucsd.edu

Fusion Concepts Working Groups	Cross-Cutting Issues Working Groups
<p>Emerging Fusion Concepts Convenors: D. Barnes (LANL), D. Hill (LLNL), A. Hoffman (UWash), J. Kesner (MIT), J. Perkins (LLNL), M. Yamada (PPPL)</p> <p>Inertial Fusion Concepts Convenors: J. Barnard (LLNL), J. Lindl (LLNL), C. Olson (SNL), S. Payne (LLNL), K. Schultz (GA), J. Sethian (NRL), R. Spielman (SNL)</p> <p>Magnetic Fusion Concepts Convenors: H. Berk (UT), J. Drake (UMaryland), R. Fonck (UWisc), M. Greenwald (MIT), D. Hill (LLNL), B. Rice (LLNL), J. Sarff (UWisc), R. Taylor (UCLA), T. Taylor (GA), M. Zarnstorff (PPPL)</p>	<p>Energy Issues Convenors: J. Freidberg (MIT), W. Meier (LLNL), F. Najmabadi (UCSD), J. Navratil (Columbia), W. Nevins (LLNL), J. Perkins (LLNL), N. Sauthoff (PPPL), R. Stambaugh (GA), D. Steiner (RPI)</p> <p>Plasma Science Issues Convenors: J. Cary (ColoU), V. Chan (GA), P. Drake (UMich), G. Hammett (PPPL), A. Kritz (Lehigh), M. Peng (ORNL), S. Prager (UWisc), M. Rosen (LLNL), W. Tang (PPPL)</p> <p>Technology Issues Convenors: M. Abdou (UCLA), R. Mattas (ANL), S. Milora (ORNL), J. Minervini (MIT), R. Moir (LLNL), D. Petti (INEL), J. Santarius (UWisc), D. Swain (ORNL), M. Tillack (UCSD), M. Ulrickson (SNL), K. Wilson (SNL), R. Woolley (PPPL), S. Zinkle (ORNL)</p>

Fusion Summer Study 1999

Snowmass

