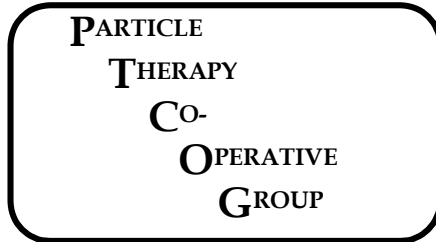


# PARTICLES

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**A Newsletter** for those interested in proton, light ion and heavy charged particle radiotherapy.

Number 34

July 2004

Janet Sisterson Ph.D., NPTC

## Dear Friends and Colleagues,

This is a time of change for PTCOG because we have elected a new Chairperson, Secretary and Steering Committee, as you will see in the articles that follow. For the time being I will continue to produce Particles and continue to collect the world wide patient statistics but I will no longer be responsible for mailing of Particles to the membership or producing the abstracts of the PTCOG meetings. These responsibilities will be taken over by the new secretary. Questions regarding PTCOG should be directed to the new Chairperson and Secretary.

Your Particles editor but no longer PTCOG secretary, Janet Sisterson

Costs: At PTCOG XIX, the Steering Committee decided that part of the registration fee for PTCOG meetings would be used to help produce both Particles and the abstracts of the PTCOG meetings. Only part of the costs is covered in this way, so more financial help is needed from the community. PTCOG is always happy to receive financial gifts; all such gifts are deductible as charitable contributions for federal income tax purposes. To learn how to do this, please contact Allan Thornton, PTCOG secretary.

Facility and Patient Statistics: I continue to collect information about all operating or proposed facilities. Please send me your information. My latest **published** summary of the worldwide detailed patient statistics through 2001 is:

“Status of Ion beam therapy in 2002.” Author: J. M. Sisterson. In: Application of Accelerators in Research and Industry: 17<sup>th</sup> Int’l Conference, edited by J. L. Duggan and I. L. Morgan, 2003, CP680, American Institute of Physics. Copies are available on request. This summary will be updated through 2003 and presented at the 18<sup>th</sup> International Conference on the Applications of Accelerators in Research and Industry, October 10-15 2004.

Particles Newsletter and Abstracts from PTCOG meetings. For this issue, Particles and the Abstracts from the last PTCOG meeting will be issued on a CD. Computerized Medical Systems (CMS) in St Louis has kindly offered to cut the CDs. I thank them for their support of Particles. The CD containing Particles will also contain most of the presentations from the 40<sup>th</sup> PTCOG meeting held in Paris, France June 14-16 2004

**Please join!!!! PTCOG Mail server:** Niek Schreuder and colleagues at the Midwest Proton Radiotherapy Institute in Bloomington, Indiana have initiated this new service. Here is how to join:

You can email Niek Schreuder at [aschreud@indiana.edu](mailto:aschreud@indiana.edu) and ask to be added to the mail server referred to as the PTCOG\_List. This they can do without having to join Yahoo. Better, however, is to join yahoo by getting a yahoo account and login - free of charge - and then join the PTCOG\_list group – see instructions below. This will allow them to see previous mailcommunications and other advantages.

Here is a sample set of instructions.

"If you would like to learn more about the PTCOG\_List group or join the group, please visit [http://groups.yahoo.com/group/PTCOG\\_List](http://groups.yahoo.com/group/PTCOG_List). To send a message to all the members (after you have joined) simply send email to [PTCOG\\_List@yahoogroups.com](mailto:PTCOG_List@yahoogroups.com)". Only members can post messages to the group. A member is defined as someone who's email address is in the yahoo PTCOG\_List. To unsubscribe from this group, send an email to: [PTCOG\\_List-unsubscribe@yahoogroups.com](mailto:PTCOG_List-unsubscribe@yahoogroups.com).

Particles on the Internet The web page for PTCOG and the Particles Newsletter is at: <http://ptcog.mgh.harvard.edu>.

Other proton therapy links:

NPTC, MGH, Boston: [http://cancer.mgh.harvard.edu/cancer\\_radonc\\_nptc\\_home.htm](http://cancer.mgh.harvard.edu/cancer_radonc_nptc_home.htm)

LLUMC, California: <http://www.llu.edu/proton>

U of California, Davis: <http://crocker.ucdavis.edu/cnl/research/eyet.htm>

Midwest Proton Radiotherapy Institute: <http://www.mpri.org>

National Association for Proton Therapy: <http://www.proton-therapy.org>

TRIUMF, Canada; protons: [http://www.triumf.ca/welcome/proton\\_thrpy.html](http://www.triumf.ca/welcome/proton_thrpy.html)

TRIUMF, Canada; pions: [http://www.triumf.ca/welcome/pion\\_trtmt.html](http://www.triumf.ca/welcome/pion_trtmt.html)

CPO, Orsay, France: <http://www.protontherapie-orsay.fr>

PSI, Switzerland: <http://radmed.web.psi.ch>

TERA foundation, Italy: <http://www.tera.it>

Catania, Italy: <http://www.lns.infn.it>

GSI homepage: <http://www.gsi.de>

HMI Berlin: <http://www.hmi.de>

The Svedborg Laboratory, Sweden: <http://www.tsl.uu.se>

Clatterbridge Centre for Oncology: <http://ccotrust.nhs.uk>

Clatterbridge collaboration with the CASIM project: <http://www.casim.ac.uk>

Rinecker Proton Therapy Center, Munich, Germany: <http://www.rptc.de>

MedAustron: <http://www.medastron.at>

ITEP, Moscow, Russia: <http://www.protontherapy.itep.ru>

Tsukuba, Japan - PMRC: <http://www.pmrc.tsukuba.ac.jp/index.html>

HIBMC, Hyogo, Japan: [http://www.hibmc.shingu.hyogo.jp/english/aisatu-e\\_top.htm](http://www.hibmc.shingu.hyogo.jp/english/aisatu-e_top.htm)

HIMAC, Chiba, Japan: <http://www.nirs.go.jp/ENG/nirs.htm> (ENG case sensitive)

IThemba LABS, South Africa: <http://medrad.nac.ac.za/index.htm>

### ARTICLES FOR PARTICLES 35

The deadline for articles for the Particles 35 is November 30 2004 and should **NOT** exceed two pages in length. Please send all articles to:

Janet Sisterson Ph.D.  
Northeast Proton Therapy Center  
Massachusetts General Hospital  
30 Fruit Street, Boston MA 02114

Telephone: (617) 724-1942  
Fax: (617) 724-9532  
E-mail: [jsisterson@partners.org](mailto:jsisterson@partners.org)

### PTCOG BUSINESS and FUTURE PTCOG MEETINGS

In June 2001, the Steering Committee recommended that the Chairperson and Steering Committee be appointed for 3-year terms. Therefore, by the 40<sup>th</sup> PTCOG meeting in Paris, France in June 2004, new Steering Committee members had been appointed and at the Steering Committee meeting in June 2004 a new Chairperson was elected. The Chairperson, Secretary and Steering Committee members are listed below. These appointments run through June 2007. In an effort to provide continuity to PTCOG, the position of Secretary is not limited to 3 years but the Secretary has no voting rights.

Chair: Alfred R. Smith Ph. D.  
M. D. Anderson Cancer Center  
Department of Radiation Physics  
1515 Holcombe Boulevard  
Houston TX 77030  
E-mail: [alsmith@mail.mdanderson.org](mailto:alsmith@mail.mdanderson.org)

Secretary: Allan Thornton M. D.  
MPRI  
2425 N. Milo B. Sampson Lane  
Bloomington, IN 47408  
Email: [info@ptcog41.org](mailto:info@ptcog41.org)

## MEMBERS OF THE STEERING COMMITTEE

Canada	TRIUMF, BC	E. Blackmore
China	Wanjie, Zibo	L. Jiamin
France	Orsay	L. Feuvret
	Nice	P. Chauvel
Germany	GSI/Heidelberg	D. Schulz-Ertner
	HMI, Berlin	H. Kluge
	RPTC, Munich	J. Hauffe
Italy	Catania, Sicily	L. Raffaele
Japan	HIMAC, Chiba	H. Tsujii
	NCC, Kashiwa	T. Ogino
	PMRC, Tsukuba	Y. Akine
	HIBMC, Hyogo	Y. Hishikawa
	Shizuoka	S. Muruyama
	WERC	S. Fukuda
Korea	NCC, Seoul	J. Kim
Russia	ITEP, Moscow	V. Khoroshkov
	JINR, Dubna	Y. Luchin
	PNPI, St Petersburg	D. Seliverstov
South Africa	IThemba LABS	F. Vernimmen
Sweden	Uppsala	E. Blomquist
Switzerland	PSI	G. Goitein
UK	Clatterbridge	A. Kacperk
USA	NPTC-MGH/HCL, MA	S. Rosenthal
	LLUMC, CA	J. Slater
	MPRI, IN	
	UCSF, San Fransisco, CA	W. Wara
	M. D. Anderson, TX	A. Smith
	FTPI, FL	J. Palta

The times and locations of the next PTCOG meetings are as follows:

PTCOG 41	MPRI, Indiana, USA	October 11 - 13 2004
PTCOG 42	Tokyo, Japan Hosted by NCC, Kashiwa and Shizuoka Cancer Center	June 8 - 10 2005
PTCOG 43	RPTC, Munich, Germany	Fall 2005
PTCOG 44	PSI, Switzerland	Spring 2006
PTCOG 45	M. D. Anderson, Houston, TX, USA	Fall 2006

It was decided at the Steering Committee meeting that from 2007, there would be only one PTCOG meeting a year. We are very grateful to CNAO, Italy; Wanjie, Zibo, China; SPTC, Uppsala, Sweden; and NCC, Seoul, Korea for offering to host meetings in 2007 and 2008. The Steering Committee will at a later date consider a revised schedule.

## Letter from the PTCOG President

Dear PTCOG Colleagues,

I want to thank two special people for their dedication and long service to the PTCOG. Our immediate past president Gudrun Goitein has contributed significantly to the field of particle therapy. She is widely known and respected in our community for her professional, medical and scientific achievements and we were fortunate that she took time from her busy life to guide us during the past three years. Janet Sisterson has been our secretary for the past 10 years. Probably few people fully realize the great amount of hard work that this responsibility requires. Publishing Particles and the abstracts from our meetings is a very time consuming activity and, although she makes it appear to be seamless, it requires a significant amount of time and effort to accomplish the work. She gets it done and the result is always timely and very professional. She has served the PTCOG extraordinarily well. We owe both of these members a debt of gratitude.

Most of you probably have heard that the Steering Committee voted to begin having only one meeting per year starting in 2007. This may mean that we will have a somewhat different meeting however we need a great amount of discussion over the next two years to determine whether or not to make significant changes in our meeting format. We have also decided to move in the direction of a more formal organization with legal status and with by-laws and a structure that allows us to operate more as a truly international body that will serve a rapidly expanding field. We expect a rapid growth in the next few years as many more particle treatment facilities come on line. This will challenge us to be in the forefront in setting standards, educating young people, and leading this important medical field in such a way that we gain respect and recognition as a medical and scientific organization.

We will need the help and input from all PTCOG members. Please be critical of what we do, give us your good ideas, and volunteer for some of the important work that must be done to strengthen and build the PTCOG.

Thank you,  
Al Smith

## Minutes of the Steering Committee Meeting held at PTCOG 40 Paris, France, June 2004

27 Steering Committee and PTCOG members attended the meeting.

The new members of the Steering Committee were appointed before the Steering Committee meeting held in June 2004.

The major issues raised at the meeting were:

- **Appointment of a new Chairperson:** Al Smith of the M. D. Anderson Cancer Center was elected to be the next Chairperson. This position is to rotate between physicians and physicists.
- **Change of PTCOG secretary:** Within the last year, the MPRI, Indiana group had volunteered to take over the position of PTCOG secretary, an initiative supported by the University, and funds will be available to fund a position to support PTCOG affairs. This offer was accepted by the Steering Committee and Allan Thornton was named PTCOG secretary. Practically, the duties may gradually transfer from MGH to MPRI but we hope that the transition will be complete by the time of the next issue of Particles in January 2005.
- **Is it time for PTCOG to become a more 'formal society?'** There was much discussion about the future of PTCOG and the role that it might continue to have. It was the feeling of the committee that we should investigate the advantages/disadvantages of becoming a more formal society with dues, bylaws etc. Jatinder Palta volunteered to investigate 'how to form an International organization' and he will report on his findings at the next PTCOG meeting in October 2004.
- **Continuing education credits:** It was stressed again how important it is to be able to get Continuing Education credits for attending a PTCOG meeting. The committee recommended that PTCOG meeting organizers try to arrange this.
- **Training and education:** Gudrun Goitein reminded the committee of the importance of training and education with all the new centers being built. Training and education could be accomplished by courses given at PTCOG meetings and by existing facilities providing opportunities for training fellowships.

- **Standardization of documentation, dosimetry, and clinical studies:** A common standard for documentation that could be adopted would make it easier for the new centers coming online. It is also necessary to have dosimetry standards so that multicenter clinical trials can take place. It was also recommended that PTCOG establish some formal working groups.
- Two meetings a year vs. one meeting a year. The committee recommended changing the frequency of the PTCOG meetings. For 2005 and 2006, there will be two meetings a year. Starting in 2007, there will be one meeting a year. As mentioned above, the offers to host a meeting at dates after 2006 will remain on file. This issue will be revisited at a future PTCOG meeting.

### Honorary Members

In 2001, at the suggestion of Michael Goitein the category “Honorary member of PTCOG” was created. This award would be bestowed by the Steering Committee on a member who satisfied the following criteria”

- Has played a significant role in the leadership, organization and promotion of charged particle therapy
- Has reached some maturity of years

In addition to the honour of the title, it was suggested that the registration fees for PTCOG meetings be waived for Honorary members to encourage their extended participation.

Current Honorary members: Michael Goitein, Herman Suit and Kiyomitsu Kawachi.

<p><b>PTCOG 40</b>  <b>Bloomington, Indiana, USA</b>  <b>10 – 13 October 2004</b></p>
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The 40<sup>th</sup> meeting of the PTCOG will be held on October 11 - 13 2004, at the Bloomington Convention Center. Accommodation will be at the Courtyard Marriot Bloomington, which is attached to the Convention Center, the Grant St. Inn and the College Motor Inn. All of these hotels are within 1 -2 blocks from downtown Bloomington restaurants and shops. Details for the venues, events, and registration are posted on a meeting web site <http://www.ptcog41.org> and a link to this site is available from the PTCOG web site. Meanwhile for more information contact:

Ed Dickey  
 Telephone: 812 856 6774  
 Email: [info@ptcog41.org](mailto:info@ptcog41.org)

MPRI and the town of Bloomington are very pleased to host a PTCOG meeting, which is expected to be a great meeting with good presentations and fun extra curricular activities.

**Registration:** the registration page on the official website for PTCOG41 (<http://www.ptcog41.org>) is now active and we invite you to register ASAP. Early registration closes on Sept 15.

### Preliminary Schedule:

This will be the first PTCOG meeting where we will offer special training courses for which we will seek CME accreditation. We have arranged for two training courses (ASTRO like) in parallel on the Tuesday and Wednesday mornings between 7:00 and 8:30 am.

The topics for the training courses are:

Tuesday morning:

CLINICAL: Prostate treatments with protons - latest treatment methods and clinical outcomes;

PHYSICS: IGRT in proton therapy - current methods and new developments.

Wednesday Morning:

CLINICAL: Chordomas treatments with protons;

PHYSICS: Information systems in proton therapy with special reference to the DICOM-RT standard for Hadron therapy.

**“Fall School in basic Proton Therapy Physics” Oct 9 - 10, 2004:**

We are also happy and privileged to announce that in addition to these training courses, Dr Bernie Gottschalk will also teach on basic proton therapy physics on the Saturday and Sunday before PTCOG41 i.e. Oct 9 - 10, 2004. We call this the “Fall School in basic Proton Therapy Physics” This school is aimed at people that want to refresh themselves in the physics behind proton therapy and for newcomers to the field of proton therapy.

The detailed program will be available later but there will be 2 Focus Sessions:

**Focus session 1:**

Regional based proton therapy facilities. Presentations discussing the following topics are invited for this session.

1. Establishing regional proton therapy facilities
2. Foundations for referrals
3. Information systems
4. Networking
5. Patient Needs

**Focus Session 2:**

Extracranial proton therapy treatments. Presentations discussing the following topics are invited for this session.

1. Extracranial treatment sites suitable for proton treatments
2. Immobilization methods for extracranial treatments
3. Patient positioning for extracranial treatments
4. Problems related to organ motion
5. Treatment planning for extracranial treatments

**PTCOG 41 Auxiliary and social events**

Sunday October 10

3 pm Registration opens

6 pm Opening ceremony/Community welcome

**at the Convention Center**

Monday October 11

4 pm Tour of MPRI facility

6 pm Wine tasting and Hors D’Oevres

**at the Oliver Winery**

8 pm Free time, dinner on your own

Tuesday October 12

7 pm Cocktails and Hors D’Oevres

**at the IU Auditorium Hall of Murals**

8 pm Dinner and Entertainment

**in the IU Auditorium**

**PTCOG 42  
Tokyo, Japan  
June 8 – 10 2005**

The 42<sup>nd</sup> PTCOG meeting will be held on June 8-10, 2005, at the International Lecture Hall in the campus of the National Cancer Center, Tsukiji, Tokyo, Japan. National Cancer Center of Tokyo is located in the center of Tokyo, and many hotels, restaurants and shops are within several blocks. Details for the venues, events, and registration will be announced on the web site that will become available soon.

For more information, please contact:

Takashi Ogino (NCC, Kashiwa)

Email: [togino@east.ncc.go.jp](mailto:togino@east.ncc.go.jp)

This meeting is co-hosted by Shizuoka Cancer Center and National Cancer Center, Kashiwa, and we are very pleased to host the meeting. We are looking forward to seeing everyone at Tokyo.

## EDUCATION – TRAINING IN PARTICLE THERAPY

The following educational opportunity is available:

**Where:** PSI, Villigen, Switzerland

**What:** 1 training position at a time

**Duration:** 3 – 6 months

**Who may apply:** Physicians or Medical Physicists

**Financial support:** Guest house accommodation will be supplied.

**Contact person:** Gudrun Goitein

### PTCOG Information/News/Reports:

The following reports and articles were received by July 2004.

#### **University of Texas M. D. Anderson Cancer Center Proton Therapy Center:**

On June 18 2004 the first boatload of equipment for the M. D. Anderson Proton Therapy Center in Houston, Texas (PTC-H) arrived in the Port of Houston after a 37-day sea voyage from Hitachi City, Japan. This 650-ton shipment included three gantries and some installation equipment. The 88,000 square-foot PTC facility was approved for equipment installation on July 16 and installation of the equipment began on July 19, the exact date for first installation of equipment that was established over two years ago. There are five more major shipments of equipment planned during the next several months.

In late July the Shipment Readiness Reviews for the patient couches and passive scattering nozzles were held at Hitachi Works in Japan. The final testing of the Treatment Control System (TCS) will be carried out in September 2004 on a Simulator designed for that purpose. Testing of the TCS interface with IMPAC, the PTC information system will immediately follow the TCS tests. Testing of the Varian interface with IMPAC will occur in November 2004.

The first major release of the Varian Proton Treatment Planning System is scheduled for March 2005. This release will include modules for both the passive scattering and the IMPT treatment planning systems.

The schedule for treating the first patient at the PTC-H is January 2006. By September of 2006 all of the treatment beam lines (three gantries and two fixed beam lines) will be in operation. It is anticipated that 670 patients will be treated during the first year of operation. *Al Smith, M. D. Anderson Cancer Center, Dept. of Radiation Physics, 1515 Holcombe Boulevard, Houston, TX 77030.*

#### **One-year experience of proton beam therapy at the Shizuoka Cancer Center:**

The Shizuoka Cancer Center Hospital was opened in September 2002. This new cancer center-whose mission is to eliminate cancer expertly; and to support patients and their family wholeheartedly; to pursue progression continuously- is located in the eastern area of Shizuoka prefecture where people can easily visit from Tokyo with a one-hour ride on bullet train.

On July 29, 2003, after about one year of beam commissioning, biological evaluation and rehearsal exercises, the first patient treatment was started at the SCC Proton Therapy Facility equipped with the apparatus which had been approved as a medical device manufactured by Mitsubishi Electric Co. The clinical feasibility study of six cases has been completed without any interruptions by the end of September 2003. After the last check maintenance, a full-scale clinical use was started on November 11, 2003.

Fortunately, the operation of equipments - 235MeV synchrotron, high-energy beam transport system and two rotational gantry ports - and software is to date very favorable. By the end of June 2004, 63 patients have been started their treatment, including 6 Head & Neck, 8 lung, 10 liver, 35 prostate cancer and so forth. *S. Murayama and H. Fuji, Shizuoka Cancer Center, 1007 Shimonagakubo, Nagaizumi, Shizuoka, 411-8777 Japan. mailto: [s.murayama@scchr.jp](mailto:s.murayama@scchr.jp)*

#### **Current status of proton beam therapy at University of Tsukuba:**

Since September 3, 2001, when the first patient was treated, through June 2004, a total of 492 patients were registered for proton beam therapy at the new facility of Proton Medical Research Center, University of Tsukuba. Distribution of the 492



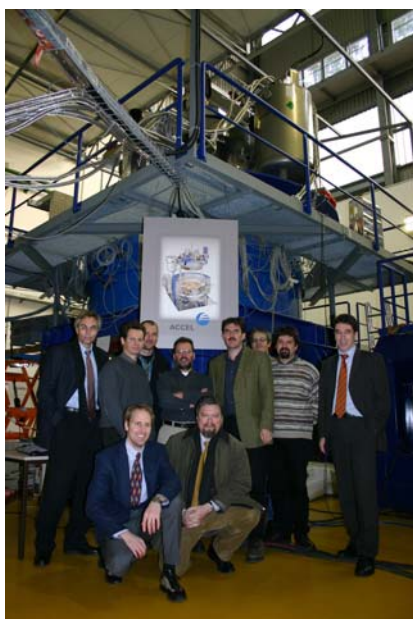
patients by disease is as follows: 143 patients had hepatoma, 82 prostate cancer, 57 lung cancer, 50 metastatic tumors, 49 head & neck cancer, 25 esophageal cancer, and remaining patients had miscellaneous diseases. We had 218 patients registered for treatment in the fiscal year (FY) 2003 (from April 2003 through March 2004). Currently we are treating 30-35 patients a day. We usually start the treatment at 10 AM and completing it at around 4 PM with an hour break at around noon. No occurrence resulting in a physical damage to a patient has occurred at our center. The equipment has been functioning satisfactory. We had 2 days in which the planned treatments were not complete out of 232 days (0.9%) planned for the treatment in FY 2003. *Yasuyuki Akine, Professor, Institute of Clinical Medicine, Director, Proton Medical Research Center, Director, Dept. of Radiation Oncology, University of Tsukuba, Tsukuba 305-8575 Japan. yakine@pmrc.tsukuba.ac.jp*

**New Medical Superconducting Cyclotron for proton therapy successfully energized:**

ACCEL reports on a major milestone in the final production stage of its newly developed 250 MeV cyclotron for proton therapy ordered by the Paul Scherrer Institut in Switzerland (PSI) for their PROSCAN proton therapy facility.

ACCEL Instruments GmbH selected the concept of a superconducting 250 MeV compact cyclotron as the most advantageous and economic proton accelerator suitable to accommodate also future needs of very fast scanning and precision proton therapy systems. ACCEL developed this new device following an idea of and collaborating with Professor Henry Blosser and the National Superconducting Cyclotron Laboratory (NSCL) at Michigan State University (MSU) and incorporating the latest state of the art in design tools, cryomagnetics, and rf technology. Currently ACCEL has two cyclotrons in the final stage of production. The first one is for PSI to become their new and independent source for their long established and to be expanded proton therapy program, called PROSCAN. PSI and ACCEL are also collaborating on the application of the large experience in proton therapy technology and operation as well as development of advanced schemes. The second cyclotron is part of ACCEL's fully integrated proton therapy system for the Rinecker Proton Therapy Center (RPTC) under construction in Munich, Germany, prime contractor being M+W Zander, Stuttgart. The RPTC will be the first European clinical proton therapy facility when it is commissioned in spring 2005.

ACCEL now reports about the successful first ramping up of the superconducting cyclotron magnet on Friday December 12, 2003 around 7.30 p.m. After having cooled down the magnet and aligned carefully within the magnetic yoke structure the days before, the magnet could be energized to 170 Amps in the first run without any quench, corresponding to a central field of 2,51 Tesla which was measured via a NMR sensor. The operating current to produce 250 MeV protons is around 160 Amps. Thus already in the first run magnetic field well above operating conditions was achieved. The system also behaves perfectly fine with regard to cryogenics. Whereas the four cryocoolers provide around 6 W cooling power at 4.2 K, the pressure in the helium vessel has to be stabilised by counter heating. From that balance cryo losses of below 2.5 W can be calculated, thus there is a lot of margin. Even during ramping up, when additional losses due to eddy currents are produced, the system needs counter heating. In summary it can be reported about having exceeded all design goals so far, thus proving that superconducting technology can be applied to commercial cyclotrons for clinical proton therapy. Next steps are an extensive measurement campaign, expected to take several weeks time, to produce the field map necessary for final proton operations. Shipment of the first cyclotron to PSI is foreseen for March 2004.





Jürgen Duppich and Marco Schippers from PSI together with ACCEL staff in front of ACCEL's compact superconducting 250 MeV medical cyclotron after the successful magnet commissioning)

About ACCEL Instruments GmbH:

ACCEL is a technology company dedicated to design, develop, manufacture, install, commission, and maintain research and medical equipment in the fields of accelerator, magnet and beamline systems. It has been founded in 1994 as MBO out of Siemens/Interatom in Bergisch Gladbach near Cologne, Germany. Today ACCEL has 250 employees, 120.000 square feet of engineering and manufacturing space, and is a worldwide leading supplier of innovative, highly reliable device and systems solutions to international research institutions, to industrial customers, and – with its proton and ion therapy systems – to the medical market. *Hans-Udo Klein, ACCEL Instruments GmbH, Freidrich-Ebert-Str. 1, Bergisch Gladbach, D-51429, 20 December 2003.*

**UVEAL MELANOMA relapses: The controversy about safety margins.**

Protontherapy gives a chance to perform very sophisticated treatments with a quasi surgical precision if each step of the preparation and realisation of the treatment is really accurate, including the definition of the tumor volume. Safety margins definitions are not so clear that it seems and depend on many clinical, geometrical and physical parameters linked to the characteristics of the machine and beamlines.

The standard definitions of safety margins are : - 2.5mm around the envelope of the tumor which gives the lateral safety margin, - 2.5mm added to the the minimum range of protons necessary to cover the tumor, which represent the distal safety margin. The lateral safety margin is never reduced in Nice and the limit of the collimator gives the 50% isodose, due to the lateral fall-off. The distal safety margin is mainly out of the eye volume and for posterior pole tumors, due to the sphericity of the eye, the safety margin on the retina may be twice the calculated margin on the protons range. This extra margin should be dangerous for critical structures and may be reduced as well as extra-ocular safety margins without lowering the local control rate.

In a previous article (1) we described the technical requirement for protontherapy, particularly - use of bolus in order to flatten the entrance of the beam and therefore be certain that the distal shape is reliable, mainly when using a wedge filter, - new design of wedge filters, - detection of inaccuracies of the eye model using in routine a 3-D reconstruction of a CT scan of the eye, - introduction of modifications of the eye model in Eyeplan in order to have a good representation of the regions of interest.

In the article of Egger and al. (2) the authors demonstrate the existence of a relation between safety margins reduction and relapse rate in their own facility. From their experience and the control rate published in 1999 by A.Courdi et al. (3) they estimate that it is also the case in Nice. This assumption is given without precise informations on the data from Nice nor the full knowledge of what was the substratum. In this series the figure of 89% of local control at 78 months was the end of the Kaplan-Meier curve with a non calculated but certainly large confidence interval. In facts, out of 538 patients, 25 presented a relapse (4.6%).

In order to verify if the relation between safety margins reduction and local relapses existed also in Nice, two analyses were performed : - A first one on the series of patients published in 1999 by A.Courdi et al. (3) and commented in the paper by Egger, summarized in table 1, -A second one on the relapses occuring in the series of all the patients of Lyon treated in Nice from 1991 to 2003 and published for a part (1991-1997) in 2004 by L.Kodjikian et al.(4) is given in table 2.

Table 1 : relapses as a function of the distal safety margin (538 cases treated in Nice (3)).

	Relapses	Controlled
Total series (538 cases)	4.6% (25)	95.4% (513)
Distal safety margin >2mm (199 cases)	6% (12)	94% (187)
Distal safety margin <2mm (339 cases)	3.8% (13)	96.2% (326)
Mean value of distal safety margin	1.82 mm	1.49 mm

Table 2: relapses as a function of the distal safety margin for the series of patients from Lyon.

	Relapses	Controlled
Total series (428 cases)	4.7%	95.3%
Distal safety margin >2mm (214 cases)	6.5% (14)	93% (200)
Distal safety margin <2mm (214 cases)	2.8% (6)	97.2% (208)
Mean value of distal safety margin	2.05 mm	1.79 mm

None of these studies demonstrate a relation between relapse and safety margin reduction as performed in Nice. In the second series in table 2, one can observe a trend ( $\chi^2 = 3.841$  NS) for less relapses in the group with margins <2mm. Some elements may explain this trend : - the distal safety margin is more often reduced for posterior pole tumors which are smaller

than anterior ones, - the tumor reconstruction is perhaps more accurate for posterior pole tumors where we can use retinograms and angiographies.

As a conclusion, this study demonstrates that 1/ under certain conditions the use of reduced distal safety margins is safe and does not influence the local control rate, 2/ it is hazardous to extrapolate the results obtained in a facility to another one without being sure that all the parameters are comparable.

References: [1] Chauvel P, Sauerwein W, Bornfeld N, Friedrichs W, Brassart N, Courdi A, Hérault J, Pignol JP, Bondiau PY, Malandain G. Clinical and technical requirements for proton treatment planning of ocular diseases. *Front Radiat Ther Oncol* 1997 ; 30 : 133-42 [2] Egger E, Schalenbourg A, Zographos L, Bercher L, Boehringer T, Chamot L, Goitein G. Maximizing local control and survival after proton beam irradiation of uveal melanoma. *Int J Radiat Oncol Biol Phys* 2001 ; 51 : 138-147 [3] Courdi A, Caujolle JP, Grange JD, Diallo-Rosier L, Sahel J, Bacin F, Zur C, Gastaud P, Iborra-Brassart N, Hérault J, Chauvel P. Results of proton therapy of uveal melanomas treated in Nice. *Int J Radiat Oncol Biol Phys.* 1999 ; 45 : 5-11. [4] Kodjikian L, Roy P, Rouberol F, Garweg G, Chauvel P, Manon L, Jean-Louis B, Little RE, Sasco AJ, Grange JD. Survival after proton-beam irradiation of uveal melanomas. *Am J Ophthalmol* 2004 ;137(6) :1002-10.  
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### History of the Harvard Cyclotrons

The Harvard Cyclotron Laboratory may no longer exist but Dick Wilson, Professor Emeritus, Harvard University has made sure that it will not be forgotten by establishing a web site which records the history of the Harvard Cyclotrons. The first cyclotron was sent to Los Alamos and never came back. Parts of it were in existence until recently. The second Harvard Cyclotron operated from 1949-2002.

The web-based history has many photographs, information and a list of all papers published by members of the Harvard Cyclotron staff over the years. Additional information can be added to this history at any time. The web site is: <http://phys4.harvard.edu/%7Ewilson/cyclotron/history.html>.

In addition to this web based history, a small hard copy book (and in paperback), dedicated to Andreas (Andy) Koehler, has been published by the Harvard University Physics Department and is on sale at the Harvard University Press. <http://www.hup.harvard.edu/catalog/WILHIM.html>.

Janet Sisterson

### OncoLink: the largest website in the world for cancer information.

The website, at <http://www.oncolink.upenn.edu> currently gets 8 – 11 million hits per month making it one of the busiest healthcare sites in the world and an international resource for both physicians and patients. A dedicated section on proton therapy is being added to this website, which will certainly increase the visibility of proton therapy throughout the world. At the present time, this section is under construction and help is sought from all in the proton therapy community to make sure that we have the most pertinent, correct and up-to-date information as possible. Please visit the site, see what is there already and send me any comments or additional information. *James. M. Metz, Editor-in-Chief, OncoLink, University of Pennsylvania, 3400 Spruce Street, 2 Donner Bldg, Philadelphia, PA 19104, Metz@xrt.upenn.edu.*

**TREATMENT PLANNING SYSTEMS FOR PROTON AND ION BEAM THERAPY**

July 2004

The following Table is an extension of that originally presented in October 1999 by Skip Rosenthal, MGH at the Workshop on Treatment Planning Systems, PTCOG XXXI. Please send corrections/additions to Janet Sisterson.

Year	Created By	System Name	Status
1979-93	LBL	LBL system	Not Available
1980	MGH	Rx	<b>Distributor MGH</b>
1980	MGH	EYEPLAN	<b>Distributor MGH – EYES only</b>
1990-96	MGH/Seimens	V-Treat(AXIOM)	Not Available
198?,1991	PSI	PSI system/Pion	<b>Distributor PSI</b>
1995	DKFZ/Royal Marsden	Voxelplan/Proxelplan	<b>Adapted by NAC, DKFZ</b>
1996	Radionics/MGH/HCL	P-Knife	Not Available
1997	LLUMC/PerMedics	OptiRad 3D	<b>FDA approved; commercial</b>
1998	Tsukuba	Hitachi system	In-house system
1998	DKFZ	OCTOPUS	<b>Under development – EYES only</b>
1994	Orsay/Curie	ISIS	Distribution ?
1998	CMS/MGH	FOCUS	<b>Commercial Release 1999</b>
1998	DKFZ	KonRad Plus Protons	Research Only
1989 – 2000	CCO, Clatterbridge, UK	EYEPLAN v1.6 (VMS)	Available free;eyes only; research only
1999	GSI	TRiP98	Research, Clinical, Scanned Ions
2000	Varian	Polaris	FDA approved for passive treatment modalities
2001	ITEP (Moscow)	ProGam	Adapted in PTF ITEP
2002	MDS Nordion	Helax-TMS	<b>FDA approved: commercial</b>
2002	CMS/Mitsubishi	FOCUS/M	<b>Commercial Release 2001</b>
	RenderPlan		?
	Adac		?
	Michigan		?

**Proposed NEW FACILITIES for PROTON & ION BEAM THERAPY - July 2004**

INSTITUTION	PLACE	TYPE	1 <sup>ST</sup> RX?	COMMENTS
Wanjie, Zibo	China	p	2004	Under construction. 235 MeV cyclotron, 3 gantry +1 horiz
IMP, Lanzhou	PR China	C-Ar ion	2004	C-ion from 100MeV/u and p (120 MeV) at HIRFL; clin. treat;biol. research; no gantry; shifted patients
PSI	Switzerland	p	2004	Addition of a 250 MeV cyclotron, 2 <sup>nd</sup> gantry, new 1 fixed
Rinecker, Munich	Germany	p	2005	4 gantries, 1 fixed beam, 250 MeV, scanning beams.
NCC, Seoul	Korea	p	2005	230 MeV cyclotron, 2 gantries, 2 horiz, 1 exp horiz.
FPTI, U. of Florida	FL, USA	p	2006	230 MeV cyclotron, 3 gantries, 1 fixed.
IThemba LABS, Somerset West	South Africa	p	2006	230 MeV, 1 gantry, horiz. + 30° beams, 1 horiz. + 15° beams
M. D. Anderson Cancer Center	TX, USA	p	2006	250 MeV synchrotron; 3 gantries; 1 fix(2 beams)+1 exp rooms
Chang An Information, Beijing	China	p	2006	235 MeV Cyclotron, under construction.
Heidelberg	Germany	p, ion	2007	1 gantry; 2 fixed beam; p/carbon; int. contr. Raster scan
CNAO, Pavia	Italy	p, C-ion	2007	Synchrotron 400 MeV/u. 3 horiz, 1 vertical beam
Med-AUSTRON	Austria	p, ion	2007?	p gantry; 1 ion gantry; 1 fixed p with 2 lines; 1 exp room
Trento, Italy	Italy	p	2008?	cyclotron; 1 gantry; 1 fixed
CGMH, Northern Taiwan	Taiwan	p	?	250MeV synchrotron/230MeV cyclotron;3 gantry,1 fixed
Bratislava	Slovakia	p, ion	?	72 MeV cyclotron; p; ions; +BNCT, isot prod.
Erlangen	Germany	p	?	4 treatment rooms, some with gantries.
TOP project ISS Rome	Italy	p	?	70 MeV linac; expand to 200 MeV?
3 projects in Moscow	Russia	p	?	including 320 MeV; compact, probably no gantry
Krakow	Poland	p	?	60 MeV proton beam.
Proton Development N.A. Inc.	IL USA	p	?	300 MeV protons; therapy & lithography

## WORLD WIDE CHARGED PARTICLE PATIENT TOTALS

July 2004

WHO	WHERE	WHAT	DATE FIRST RX	DATE LAST RX	RECENT PATIENT TOTAL	DATE OF TOTAL
Berkeley 184	CA. USA	p	1954	— 1957	30	
Berkeley	CA. USA	He	1957	— 1992	2054	
Uppsala	Sweden	p	1957	— 1976	73	
Harvard	MA. USA	p	1961	— 2002	9116	
Dubna	Russia	p	1967	— 1996	124	
ITEP, Moscow	Russia	p	1969		3748	June-04
Los Alamos	NM. USA	$\pi^-$	1974	— 1982	230	
St. Petersburg	Russia	p	1975		1145	April-04
Berkeley	CA. USA	ion	1975	— 1992	433	
Chiba	Japan	p	1979		145	Apr-02
TRIUMF	Canada	$\pi^-$	1979	— 1994	367	
PSI (SIN)	Switzerland	$\pi^-$	1980	— 1993	503	
PMRC (1), Tsukuba	Japan	p	1983	— 2000	700	
PSI (72 MeV)	Switzerland	p	1984		4066	June-04
Dubna	Russia	p	1999		191	Nov-03
Uppsala	Sweden	p	1989		418	Jan-04
Clatterbridge	England	p	1989		1287	Dec-03
Loma Linda	CA. USA	p	1990		9282	July-04
Louvain-la-Neuve	Belgium	p	1991	— 1993	21	
Nice	France	p	1991		2555	April-04
Orsay	France	p	1991		2805	Dec-03
iThemba LABS	South Africa	p	1993		446	Dec-03
MPRI (1)	IN USA	p	1993	— 1999	34	
UCSF - CNL	CA USA	p	1994		632	June-04
HIMAC, Chiba	Japan	C ion	1994		1796	Feb-04
TRIUMF	Canada	p	1995		89	Dec-03
PSI (200 MeV)	Switzerland	p	1996		166	Dec-03
G.S.I Darmstadt	Germany	C ion	1997		198	Dec-03
H. M. I, Berlin	Germany	p	1998		437	Dec-03
NCC, Kashiwa	Japan	p	1998		270	June-04
HIBMC, Hyogo	Japan	p	2001		359	June-04
PMRC (2), Tsukuba	Japan	p	2001		492	July 04
NPTC, MGH	MA USA	p	2001		800	July-04
HIBMC, Hyogo	Japan	C ion	2002		30	Dec-02
INFN-LNS, Catania	Italy	p	2002		77	June-04
WERC	Japan	p	2002		14	Dec-03
Shizuoka	Japan	p	2003		69	July-04
MPRI (2)	IN USA	p	2004		21	July -04
					1100	pions
					4511	ions
					39612	protons
				TOTAL	45223	all particles