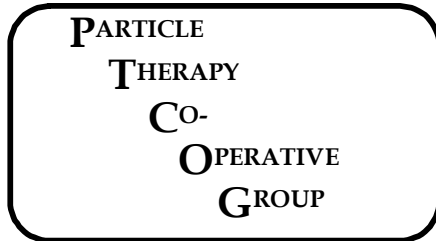


# PARTICLES

sponsored by



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

Number 33

January 2004

Janet Sisterson Ph.D., NPTC

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. The appropriate method is to send a check made out to the "Massachusetts General Hospital" and sent to Janet Sisterson at the address given below.

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.

Particles Newsletter and Abstracts from PTCOG meetings. Particles and the Abstracts from the last PTCOG meeting will continue to 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.

**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@yahoo.com](mailto:PTCOG_List@yahoo.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@yahoo.com](mailto:PTCOG_List-unsubscribe@yahoo.com).

Particles on the Internet The web page for PTCOG and the Particles Newsletter is found 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://synaptic.mvc/mcc.ac.uk/Proton/clatterbridge.htm>  
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 34**

The deadline for articles for the Particles 34 is June 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**

The Chairperson, Secretary and Steering Committee members are listed below. The Chairperson and Steering Committee were appointed in June 2001 for 3 years. Their appointments run through June 2004. 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: Gudrun Goitein  
Paul Scherrer Institute  
Division of Radiation Medicine  
Villigen PSI CH-5232  
Switzerland

Secretary: Janet Sisterson  
Northeast Proton Therapy Center  
Massachusetts General Hospital  
30 Fruit Street  
Boston MA 02114

## MEMBERS OF THE STEERING COMMITTEE

Canada	TRIUMF, BC	E. Blackmore
France	Orsay	G. Noel
Germany	GSI/Heidelberg	J. Debus
	HMI, Berlin	H. Kluge
Italy	Catania, Sicily	L. Raffaele
Japan	HIMAC, Chiba	H. Tsujii
	NCC, Kashiwa	T. Ogino
	PMRC, Tsukuba	Y. Akine
	HIBMC, Hyogo	Y. Hishikawa
	Wakasa Bay, Japan	S. Fukuda
Russia	ITEP, Moscow	V. Khoroshkov
	JINR, Dubna	G. Mytsin
South Africa	IThemba LABS	D. Jones
Sweden	Uppsala	E. Blomquist
Switzerland	PSI	G. Goitein
UK	Clatterbridge	A. Kacperek
USA	NPTC-MGH/HCL, MA	S. Rosenthal
	LLUMC, CA	D. Miller
	MPRI, IN	N. Schreuder
	Berkeley, CA	W. Chu

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

PTCOG 40	Paris and CPO, Orsay, France	June 16 - 18 2004
PTCOG 41	MPRI, Indiana, USA	October 11 - 13 2004
PTCOG 42	Japan hosted by NCC, Kashiwa and Shizuoka	Spring 2005
PTCOG 43	RPTC, Munich, Germany	Fall 2005
PTCOG 44	PSI, Switzerland	Spring 2006
PTCOG 45	M. D. Anderson, Houston, TX, USA	Fall 2006
PTCOG 46	CNAO, Italy	Spring 2007
PTCOG 47	Zibo, China	Fall 2007
PTCOG 48	? SPTC, Sweden	Spring 2008
PTCOG 49	NCC, Korea	Fall 2008

## Letter from the PTCOG President

Dear friends and colleagues

Our hosts did a wonderful job to organize and run PTCOG in San Francisco. It was an interesting conference in a very fine setting, and we were excellently taken care of. Thank you very much!

This meeting in San Francisco was PTCOG XXXIX ! That means thirty-nine meetings of professionals, who represented and still are representing a specialty in medicine, in oncology, but also in physics, technology and engineering. The goal to help particles to become clinical tools has been reached. Particle radiation therapy in hospitals is no longer a “future project”, and the interest in this treatment modality is still growing. The number of upcoming particle therapy centers is remarkable, and the scene is changing. It’s a pleasure to see more and more new faces and young people at PTCOG meetings, and it’s as well good to realize, that existing knowledge is asked for and appreciated. We need booth: the drive, enthusiasm and knowledge coming from” the youth” and the still existing creativity and broad-based knowledge and experience of the older ones. There is a unique chance in this constellation, namely to transfer the scientific curiosity onto the “next generation”! There are still so many open questions, particularly in medicine. With increasing technology = increasing possibilities, we are facing an increasing number of ways to do excellent radiation treatments as well as to overlook problems and/or make mistakes. We don’t know everything, and we are working in a medical field, where results are long-term. That makes radiotherapy difficult. It demands a combination of focused as well as general observation and patience. The worldwide network of particle therapy centers should see the chance to work closely together, so that we can learn from each other for the benefit of our patients. The fascination of science and technology has to translate into the fascination that comes out of the daily work with and for patients. They trust in us, they are convinced that we do our very best with every treatment. In a way, they give their lives in our hands – that is not a romantic remark, it is serious reality.

We are morally responsible in research, development and application. Imagine we cured all our patients! How would their life be due to our treatments? That is one of the most fascinating questions for me.

There are people, who have excellent working places, like PARIS for instance. That is one reason why we are looking forward to get there in June. The scientific program, discussions and good company are other reasons to come to the next PTCOG meeting. But I want to mention one more important point: Elections of the Steering Committee! Please take the opportunity to vote and to take part in directing the community in the future!

I wish you all happiness, health, success and peace for the New Year!

Gudrun Goitein

## Minutes of the Steering Committee Meeting held at PTCOG 39 San Francisco, USA, October 2003

These minutes are taken from the presentation given at PTCOG 39 by Gudrun Goitein.

### Future Meetings

The current schedule for PTCOG meetings is listed above. For the foreseeable future, PTCOG meetings will continue to be held twice a year.

Two topics have been proposed for the Fall 2004 meeting to be held in Bloomington, Indiana. These are:

- Immobilization for specific disease sites
- Reimbursement

### Next meeting in June 2004, Paris, France

Participants are reminded that hotel reservations for the meeting next June in Paris will have to made VERY EARLY, probably by January 2004. See further preliminary information about this meeting below. This meeting will consist of 2 days in Paris where the sessions will include:

- Standard treatment modalities
- Combination RT including surgery, chemotherapy
- Soft tissue and bone sarcomas

There will be one day at CPO, Orsay where the sessions will include:

- Interactive delineation of tumors
- Treatment planning

## **PTCOG Meeting formats**

The committee reinforced ideas that were suggested at the Chester PTCOG meeting, namely:

- Try to coordinate some, but maybe not all, PTCOG meetings with local major meetings, in particular ASTRO and ESTRO.
- Encourage PTCOG members to present results at major meetings, particularly clinical follow-up.
- Encourage PTCOG to organize workshops at major meetings.
- Steering committee meetings will be planned for the day before PTCOG to allow more time for discussion.
- The agenda for each Steering committee meeting will be circulated to members before the meeting.

In addition, the committee recommended the following:

- The increasing number of presentations is taking PTCOG away from the workshop environment.
- The committee encourages the use of rewarding Poster presentations and sessions.
- This will give more time and opportunity for focus sessions and rewarding discussion.
- Arrangements to get Continuing credit points have not yet been made. This will be discussed again at the next meeting. To have a 'global' arrangement costs both time and money.
- While PTCOG meeting organizers are grateful for (and need) the financial support from industry, the committee would like to see the financial support in the form of travel grant for young scientists to attend the meeting, rather than making the meeting itself too fancy an affair.
- The registration fees for PTCOG meetings need to be kept reasonable to allow as many people as possible – and particularly the young people – to attend.
- A set of guidelines for the meeting format will be developed by the Steering Committee.

And another comment added by the Secretary while producing Particles

- The field of Particle therapy is expanding rapidly and organizers of each session should try and include at the beginning of the session a good 'overview' talk. This provides the context for the rest of the talks in the session.

## **Registration fees for PTCOG meetings**

Organizers of PTCOG meetings are reminded that part of the registration fee is used to support the production of Particles. At the present time, the 'Particles' fee is \$10 per registrant.

## **Election of a new PTCOG Steering Committee**

At the PTCOG meeting in Boston in 2001, it was decided that the Steering Committee members and Chairperson would serve for 3 years. This means that a new Steering Committee has to be appointed before/or at the Paris PTCOG meeting to be held in June 2004. Each operating facility is eligible to appoint a Steering Committee member but is not required to do so.

In the near future, the PTCOG secretary will send a letter will to each eligible institution asking them if they wish to have representation on the PTCOG Steering Committee and if so, the name and coordinates of their representative. The appointed representative then acts as the liaison between PTCOG and the institution and has voting powers at the Steering Committee meetings. From these representatives, a new Chairperson for PTCOG will be elected.

All representatives are encouraged to attend the Steering Committee meetings but a substitute may be sent if they are unable to attend.

## **In the Future: Steering committee representation and PTCOG itself**

At the next meeting of the Steering committee, it will be decided whether the Steering committee should be expanded to include representation from soon-to-be-operating centers and from our industrial partners and the status of such representation.

All PTCOG members are reminded that Steering committee meetings are open to all members of PTCOG who are welcome to make suggestions and join in the discussion but cannot vote on issues. In this way, the non-voting members may influence the direction of PTCOG.

It has been suggested that PTCOG become a non-profit organization with a constitution written by the Steering committee. This will be discussed at the next Steering committee meeting. (A historical note from the secretary: a set of guidelines for the formation of PTCOG was developed in the middle 1980s at the time of its formation).

## **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.

**PTCOG 40  
Paris, France  
June 16 – 18 2004**

Preliminary details of this meeting can be found at the website <http://www.protontherapie-orsay.fr/ptcogcpo>. Essential information is summarized below.

**Registration Fee:** approximately 270 euros, if paid before March 15 2004, 330 euros after this date. This includes all sessions, lunch and coffee breaks, CPO barbeque and book of abstracts. The registration form can be found on the web site.

**Conference secretary:** Peggy Bera at [ptcogcpo@ipno.in2p3.fr](mailto:ptcogcpo@ipno.in2p3.fr). Centre de Protontherapie d'Orsay, Phone: +33 1 69 29 87 29; fax +33 1 69 29 87 19. If you need an official invitation letter, contact the conference secretary.

**Date and Place:**

Tuesday June 15	18:00	Registration and welcome cocktail party in the Salon du Sénat
Wednesday June 16		Registration continues and the meeting begins in the Constant Burg Auditorium at the Curie Institute followed by the Conference dinner.
Thursday June 17		Special session to be held in the Pierre Lehmann Auditorium, Orsay and visit to CPO. Transportation from Paris to Orsay by RER is included in the registration fee. In the evening there will be a special show and barbeque in the gardens of the University.
Friday June 18		Meeting continues at the Curie Institute

**Preliminary Program:**

This will contain invited talks, selected oral contributions and poster sessions. All facility status reports will be accepted only for poster presentations. Proceedings of the conference will be published, which will contain the text of the invited talks.

Topics that will be covered include:

1. Soft tissues and bone sarcomas
2. Standard treatment modalities
3. Combination radiotherapy, surgery and chemotherapy
4. Interactive delineation of tumors
- 5.

**Contributions:** A sample file in Word to be used for preparing the abstracts can be found on the conference web site. The abstract files must be submitted electronically before March 1 2004.

**Lodging:** Each participant is expected to make their own arrangements. Details can be found on the web site. Paris is a busy place, YOU MUST MAKE YOUR HOTEL RESERVATIONS EARLY and it is suggested that you should make your reservations by January 2004.

**Deadlines:**

- |                               |                 |
|-------------------------------|-----------------|
| • Abstracts of contributions  | January 15 2004 |
| • Acceptance of contributions | March 1 2004    |
| • Final registration          | March 1 2004    |
| • Final circular              | May 31 2004.    |

\*\*\*\*\*

Please **NOTE THE DATES OF THESE DEADLINES**, for this meeting PTCOG members will have to plan well ahead.

\*\*\*\*\*

**PTCOG 40**  
**Bloomington, Indiana, USA**  
**11 – 13 October 2004**

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 will be announced soon and will be posted on a meeting web site and the PTCOG web site when details become available. Meanwhile for more information contact:

Ed Dickey  
Telephone: 812 856 6774  
Email: eddickey@indiana.edu

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.

**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 December 2003.

Do you know about the following new research journal?

Technology in Cancer Research & Treatment is a relatively new bimonthly peer-reviewed research journal. The webpage for this journal is at <http://www.tcrt.org>.

The October 2003 issue includes a special section on Hadron Therapy.. Coderre et al. summarize the key issues and describe the latest developments of BNCT in a comprehensive review. A paper by Paganetti on the RBE of protons has an introduction about proton radiation therapy in general and reviews the present status of the knowledge about proton radiobiology together with its clinical significance and implementation. Bussiere and Adams review the general treatment planning process for proton therapy as well as issues regarding patient set-up and patient-specific treatment hardware. Moyers and Miller address practical considerations in terms of beam set-up and treatment planning. Two papers by Oelfke, Trofimov and Bortfeld describe new developments in proton treatment planning and delivery for intensity modulated proton beams. A paper by Jäkel et al. shows the current status and the potential of heavy ion therapy. The biological effectiveness of heavy ions and the clinical implementation of biophysical model calculations for heavy ions is addressed by Krämer et al. *Harald Paganetti, Northeast Proton Therapy Center, Massachusetts General Hospital, 30 Fruit Street, Boston MA 02114.*

**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.*

**In Memoriam: Elizabeth I. Minakova, 1925-2003**

The Protontherapy Group at ITEP, Moscow, Russia, has suffered a heavy loss. On October 6, this year, our leader and teacher, Elisabeth Minakova, has passed away after a long illness. Before retirement, just three years ago, she was a Chief Medical Officer and a Deputy Chief of the Department at ITEP.

Dr. Minakova was one of the founders of proton therapy in USSR where its development started in the late sixties. She also actively participated in the scientific cooperation world wide while being a member of the ad hoc international group on proton therapy, PTCOG. Her job history begins during the 2<sup>nd</sup> World War when she joined defense labor units to protect Moscow from the approaching Nazi forces. She was just 16 years at the time. That war changed her plans for the future. She was going to play music, to be a pianist. Instead, she applied to the Medical School (1<sup>st</sup> Medical (Sechenov) Institute, Moscow). There she combined studies with work in military hospitals, for which she was awarded a medal.

She began her career in medicine as an attending physician at the Institute of Neurology, Moscow. There in the late fifties, she got her Ph.D. degree after defending a thesis devoted to questions of radiation therapy and research on occupational diseases. Over the years she became an accomplished neurologist when in 1967 the Academician N.N. Blokhin has invited her to participate in development of the proton therapy at the Oncological Scientific Center, Moscow. She accepted and subsequently headed a group coordinating all efforts of the several Moscow clinics in this program. At the same time, the chief focus of her own research was the development of techniques of proton intracranial irradiation for medical practice.

In 1974, she was the first, who tried ‘proton brain radiosurgery on animal models (rodents). She showed different radiosensitivity of different zones of the pituitary gland. These and other findings determined her later approach to radiotherapy, which she taught to other radiologists: symptoms of the disease and individual characteristics of the patient dictate the dosage, density and distribution of proton treatment. All this laid the foundation of the new treatment of patients: inhibition of pituitary gland by a proton beam, which for the first time was developed by her with collaboration with our group.

Since 1979 Dr. Minakova supervised a group of proton therapy at Bourdenko Institute of Neurosurgery where under her management the techniques of proton therapy of intracranial neoplasm were created and developed as an alternative to invasive neurosurgical intervention.

In 1984 she was awarded Gosudarstvennaya Premiya (State Premium), the highest award possible for scientist in Russia. It was granted for participation in creation of the centre of proton therapy at ITEP. Dr. Minakova has published over 300 scientific articles and reports. She commanded a great scientific authority, respect and love of everyone, who knew her. She distinguished herself by devotion to well-being of her patients and science, by intelligence, modesty, critical and creative attitude in everyday business.

Above all, Elizabeth loved her two sons, identical twins, Nikolai and Ilia. Her talents run in the family. Both sons graduated from prestigious universities and possess several degrees. They have successful careers and loving families. Nikolai resides in Moscow and Ilia in Chicago. Despite a long distance, the family kept together: they were in constant touch and Ilia often visited his Mom and vice versa. Elizabeth is survived by five grandchildren, all lovely granddaughters.

We are in deep grief. The memory about Elizabeth will remain in our hearts forever.

Vladimir Khoroshkov and Michael Lomanov



## TREATMENT PLANNING SYSTEMS FOR PROTON THERAPY

January 2004

The following Table was 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 GSI, 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
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 - January 2004

INSTITUTION	PLACE	TYPE	1 <sup>ST</sup> RX?	COMMENTS
Wanjie, Zibo	China	p	2004	Under construction. 230 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
Shizuoka Cancer Center	Japan	p	2005	synchrotron 235 MeV; 2 gantries; 1 horiz; funded.
Rinecker, Munich	Germany	p	2005	4 gantries, 1 fixed beam, 250 MeV, scanning beams.
NCC, Seoul	Korea	p	2005	230 MeV cyclotron, 2 gantries, 1 horiz, 2 research lines.
Heidelberg	Germany	p, ion	2005	1 gantry; 2 fixed beam; p/carbon; int. contr. Raster scan
FPTI, U. of Florida	FL, USA	p	2005	230 MeV cyclotron, 2 gantries, 1 fixed, 2 research lines.
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	230 MeV Cyclotron, under construction.
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.
CNAO, Milan & Pavia	Italy	p, ion	?	synchrotron; 2 gantry;1 fixed beam rooms;1 exp. room
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

January 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	June-91
Uppsala	Sweden	p	1957	— 1976	73	
Harvard	MA. USA	p	1961	— 2002	9116	
Dubna	Russia	p	1967	— 1996	124	
ITEP, Moscow	Russia	p	1969		3663	Dec-03
Los Alamos	NM. USA	$\pi^-$	1974	— 1982	230	
St. Petersburg	Russia	p	1975		1029	June-98
Berkeley	CA. USA	ion	1975	— 1992	433	June-91
Chiba	Japan	p	1979		145	Apr-02
TRIUMF	Canada	$\pi^-$	1979	— 1994	367	Dec-93
PSI (SIN)	Switzerland	$\pi^-$	1980	— 1993	503	
PMRC (1), Tsukuba	Japan	p	1983	— 2000	700	July-00
PSI (72 MeV)	Switzerland	p	1984		3712	Dec-02
Dubna	Russia	p	1999		191	Nov-03
Uppsala	Sweden	p	1989		311	Jan-02
Clatterbridge	England	p	1989		1287	Dec-03
Loma Linda	CA. USA	p	1990		8626	Nov-03
Louvain-la-Neuve	Belgium	p	1991	— 1993	21	
Nice	France	p	1991		1951	June-02
Orsay	France	p	1991		2157	Jan-02
iThemba LABS	South Africa	p	1993		446	Dec-03
MPRI	IN USA	p	1993		34	Dec-99
UCSF - CNL	CA USA	p	1994		448	July-02
HIMAC, Chiba	Japan	C ion	1994		1601	Aug-03
TRIUMF	Canada	p	1995		77	Dec-02
PSI (200 MeV)	Switzerland	p	1996		99	Dec-01
G.S.I Darmstadt	Germany	C ion	1997		172	June-03
H. M. I, Berlin	Germany	p	1998		437	Dec-03
NCC, Kashiwa	Japan	p	1998		230	Nov-03
HIBMC, Hyogo	Japan	p	2001		210	Dec-03
PMRC (2), Tsukuba	Japan	p	2001		327	Nov-03
NPTC, MGH	MA USA	p	2001		607	Dec-03
HIBMC, Hyogo	Japan	C ion	2002		30	Dec-02
INFN-LNS, Catania	Italy	p	2002		52	July-03
WERC	Japan	p	2002		8	Aug-03
					1100	pions
					4290	ions
					36111	protons
				TOTAL	41501	all particles