PARTICLES

sponsored by

PARTICLE THERAPY CO-OPERATIVE GROUP

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

Number 28 July 2001 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. We thank GMW Associates for their kind donation to Particles.

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 1997 is:
"Ion beam therapy: overview of the world experience." Author: J. M. Sisterson. CP576, Application of Accelerators in Research and Industry – Sixteenth Int'l Conf., eds. J. L. Duggan and I. L. Morgan, American Institute of Physics, (2001) p865-868. Copies available on request.

Particles on the Internet: The URLs for the Harvard Cyclotron Laboratory, which contain links to PTCOG and Particles are:

- http://neurosurgery.mgh.harvard.edu/hcl/ or http://brain.mgh.harvard.edu:100/hcl

Other proton therapy links:

- Northeast Proton Therapy Center: http:// www.mgh.harvard.edu/depts/nptc/nptc.htm
- LLUMC, California: : http://www.llu.edu/proton
- U of California, Davis: http://crocker.ucdavis.edu/cnl/research/eyet.htm
- Midwest Proton Radiation Institute: http://www.iucf.indiana.edu/MPRI/index.html
- National Association for Proton Therapy: http://www.proton-therapy.org
- TRIUMF, Canada; protons: http://www.triumf.ca/welcome/proton_thrpy.html
- TRIUMF, Canada; pions: http://www.triumf.ca/welcome/pion_trtmt.html
- CPO, Orsay, France: http://www-sop.inria.fr/epidaure/personnel/bondiau/CPO_base/cpo_base.htm
- PSI, Switzerland: http://www.psi.ch/
- TERA foundation, Italy: http://www.tera.it
- Catania, Italy: http://192.135.37.191/catana/

- GSI homepage: http://www.gsi.de
- The Svedborg Laboratory, Sweden: http://www.tsl.uu.se
- Clatterbridge Centre for Oncology: http://synaptic.mvc.mcc.ac.uk/simulators.html
- ClatterBridge collaboration with the CASIM project: http://www.casim.ac.uk
- Rinecker Proton Therapy Center, Munich, Germany: http://www.rptc.de
- ITEP, Moscow, Russia: http://www.protontherapy.itep.ru
- Tsukuba, Japan - PMRC: http://www.pmrc.tsukuba.ac.jp/index.html
- HARIMAC, Hyogo, Japan: http://www.hibmc.shingu.hyogo.jp/ENGLISH/HIBMC_home.html
- HIMAC, Chiba, Japan: http://www.nirs.go.jp/ENG/particl.htm (ENG case sensitive)
- NAC, South Africa: http://medrad.nac.ac.za/index.htm

ARTICLES FOR PARTICLES 29

November 30 2001 is the deadline for news for Particles 29, the January 2002 issue. Address all correspondence for the newsletter to:

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Articles for the newsletter should **NOT** exceed two pages in length.

PTCOG BUSINESS and FUTURE PTCOG MEETINGS

At PTCOG XXXIV held in Boston, Massachusetts in June 2001, the new Steering Committee met for the first time. Each operating – and soon to be operating facility – was invited to appoint a representative to the Steering Committee to serve a 3 year term. Facilities that are now closed but contributed significantly to particle therapy in the past were also invited to appoint a representative. Some facilities opted not to be represented on the Steering Committee at this time. The Steering Committee members are listed below. The Steering Committee then elected a new Chairperson who will also serve a 3-year term. For continuity (and convenience) Janet Sisterson will remain as the Secretary to PTCOG and the editor of Particles.

At the conference dinner, Gudrun Goitein, the new PTCOG chair, presented a plaque to the past PTCOG Chair, Michael Goitein, in recognition and appreciation of his leadership of PTCOG for the past 10 years.

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
June 2001

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
	HARIMAC, Hyogo	Y. Hishikawa
	Wakasa Bay, Japan	S. Fukuda
Russia	ITEP, Moscow	V. Khoroshkov
	JINR, Dubna	G. Mytsin
South Africa	NAC	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 XXXV	Tsukuba, Japan	November 14-16 2001
PTCOG XXXVI	Catania, Sicily	Spring 2002
PTCOG XXXVII	Cape Town, South Africa	Fall 2002
PTCOG XXXVIII	Hosted by Clatterbridge, UK	Spring 2003
PTCOG XXXIX	Hosted by LLUMC, CA	Fall 2003

Note to the PTCOG community
From our new Chairperson

Dear friends and colleagues

At the PTCOG Meeting in Boston, Michael Goitein resigned after ten years from the chairmanship of our worldwide active community. We all appreciate very much his longstanding personal and professional dedication to the ideas and activities of PTCOG and say "thank you"! As "man of the first hours" of clinical proton therapy and of PTCOG, he has contributed so substantially to what we call state of the art and routine today. His treatment planning programs, for instance, have pioneered continuous developments and improvements in both conventional and particle radiotherapy and medical physics. His many creative ideas have challenged and helped us to never stand still in the attempt to provide best possible treatments for our patients. Michael now starts a new phase in his life, where he will be less stressed but still active and certainly deeply connected to us, to our present and future development and to the common ideas which will carry us on to the moment, when particle radiation therapy is no longer something exotic, but instead a worldwide available element of modern cancer therapy.

The Steering Committee has decided for a change of the meaning of the "P" in our logo from P*roton* to P*article*, as meanwhile the clinical use of heavy ions has become a reality with good prospects for the future. I am sure that the entire community will feel comfortable under the umbrella of "Particle". The other duty of the Committee was to vote for a new chairperson. The general idea was to elect a physician, and the votes fell on me as the head of PSI's Proton Therapy Project. I am very honored by this election, and I shall do my very best to head the community in a communicative and collegial way. Janet Sisterson will hopefully stay by my side with her excellent support and management of Particles and many other logistics. Thank you, Janet! I also want to thank my home team at PSI for giving me the background and support, which is conditional for my daily work as radiation oncologist as well as chairperson of PTCOG. In this sense, I take the vote also as complement for the Division of Radiation Medicine at PSI.

Thinking of our future, I see with great satisfaction the many particle therapy centers, which are either under construction or under planning or still in "statu nascendi". So, we are on the way out of the shelter of large physics research institutions into the "real world" of medical environments, e.g. major hospitals and university clinics. This implies that we have to be prepared to exist under very different conditions – personally, economically, professionally - but with equally, if not better, standards of performance and results. One absolute need I see is to educate young physicians and physicists to understand and use charged particles as an important tool of oncology. The current experts are far too few to maintain the standards, which have been established, and to cover the needs of more centers and many more patients. We have to invest in training and the transfer of our knowledge as well as in the acquisition of new experiences with new treatment machines and their potentials. I want to bring up the idea that our industrial partners help with the duty of training young colleagues (as the companies probably want to sell accelerators and gantries also in the far future....), e.g. by creating a fund for young radiation oncologists and medical physicists to stay for, let's say, up to 6 months at a particle therapy center, also as exchange, to learn and get permanently involved in the field. We should discuss this more in detail at our next meeting. I am looking forward to seeing you in great number in Tsukuba!
With best regards,

Gudrun Goitein

PTCOG XXXV MEETING
November 14 (Wednesday) – 16 (Friday) 2001
Host Institute: Proton Medical Research Center (PMRC), University of Tsukuba, Tsukuba City, Japan

Local Organizing Committee: Yasuyuki Akine and other members

Contacts:
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Atsuko ASANO (Ms.)
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E-mail: ptcog@pmrc.tsukuba.ac.jp

Mailing Address: Proton Medical Research Center, University of Tsukuba,1-1-1 Tennoh-dai, Tsukuba City, Ibaraki 305-8575, Japan.

Detailed information will be available: http://www.pmrc.tsukuba.ac.jp/ptcogxxxv.htm

Deadlines: September 30 2001 call for papers; abstracts; sign up for tours
October 30 2001 meeting registration
details are given below.

Registration Deadline for the Meeting Registration will be October 30, 2001**.**
Registration Fee will be **25,000** Yen: Student and/or Resident (with ID) will be **15,000** Yen.
Call for papers: Deadline for the Oral/Poster presentation is September 30, 2001.
Official language: English.

Travel: Please refer to our Homepage: http://www.pmrc.tsukuba.ac.jp/ptcogxxxv.htm
Accommodation: You are requested to book a hotel by Fax directly to the Hotel

(a) Tremont Hotel	Fax: +81-298298-51-8710
(b) Okura Frontier Hotel Tsukuba and Epochal Okura	Fax: +81-298-52-5623
(c) Hotel Marroad Tsukuba	Fax: +81298-22-3244

For further information on Hotels, please refer to: http://www.pmrc.tsukuba.ac.jp/ptcogxxxv.htm

Meeting Place: The University Hall (Tsukuba Daigaku Kaikan in Japanese)**,** University of Tsukuba.

Scientific Program: Main topics of the Sessions are provisionally set as follows.
Focus Sessions: RBE of Proton Beams; Quality Assurance for Proton Therapy; Treatment of tumors in the body trunk.
Other Sessions: Clinical Trials and Results; Treatment Protocols; Dosimetry; Treatment Planning; Beam Delivery Systems; Irradiation Technique; Radiobiology; RBE of Heavy Ions; New Facilities; Database; Control System.
An invited speaker will present a talk entitled “New Facilities in Japan”. All other presentations concerning new facilities will be assigned to Poster Sessions.

Abstracts: Deadline for submission will be September 30, 2001.
Page limit: No more than half a page long.
Publishing date: November 14, 2001.

Social programs:
(a) November 13. Optional sightseeing tour to Kasama City. Fee will be **5,000** Yen.
Deadline for application will be September 30, 2001
(b) November 14. Violin concert by Atsuko Tenma at Nova Hall, Tsukuba City.
(c) November 15. Banquet at Sansui-tei, Tsukuba City.

Technical tours:
(a) November 14. Tour to Proton Medical Research Center (PMRC), University of Tsukuba.
(b) November 16. Optional tour to National Cancer Center. Fee will be **4,000** Yen.
Deadline for application will be September 30, 2001

Satellite meetings: See below for further information.
(1) Hyogo Satellite Meeting.
(2) "International Forum on Promotion of Proton Cancer Therapy".

International Forum on "Promotion of Proton Cancer Therapy"
November 10 - 11, 2001, Tsuruga, Fukui, Japan

In time of the 21st century beginning, research and developments on proton cancer therapy with the accelerator are going to start in Wakasa Bay Area, where many power stations are in operation and human resources and technologies concerned with energy including nuclear energy have been gathered together. The Forum is organized for better understanding of Proton Therapy, as an advanced way of cancer treatment, for both citizens and medical researchers. We welcome many international participants to the Forum.
Period: November 10 (Sat.) and 11(Sun.), 2001
Place: The Wakasa Wan Energy Research Center (WERC)
(Nagatani, Tsuruga-city, Fukui Prefecture, Japan)
Agenda: (tentative). The first day of the Forum, Saturday, November 10 is devoted to introduction of proton therapy into the public. The second day, Sunday, November 11 is for specialists, two speeches in the morningand two panel discussions in the afternoon will be performed.

November 10 (Sat.), 2001
13:10-13:30 Welcome and Opening Address
13:30-15:00 Session 1 [Speech] "Treat Cancer in This Way"
15:15-16:15 Session 2 [Talk] "Cancer has gone"
18:00-19:00 Reception
November 11 (Sun.), 2001
10:00-11:00 Session 3 [Speech] "Present Status of Proton Cancer Therapy"
11:00-12:00 Session 4 [Speech] "Proton Cancer Therapy Project at WERC"
13:00-14:45 Session 5 [Panel Discussion] "Characteristics of Cancer Therapy Methods"
15:00-16:45 Session 6 [Panel Discussion] "Future Prospect of Proton Cancer Therapy"
16:45-17:00 Closing

Simultaneous Interpretations: Simultaneous interpretations between English and Japanese are provided for the second day only.
Registration: Please request a registration form by e-mail to forum@werc.or.jp
Registration Fee: Free.
Travel Arrangements:
*Location: WERC is located in Tsuruga-city, Fukui Prefecture about 90 km north-northeast of Kyoto. See the map at URL:http://www.werc.or.jp
*From Osaka (Kansai International Airport)
From Kansai International Airport to Osaka, it takes about one hour by West JR train (Kansai-kuko Line). From Osaka to Tsuruga, it takes about one and a half hours by the express train (West JR train), via Kyoto.
*From Tokyo (Narita International Airport)
From Narita International Airport to Tokyo, it takes about one hour by East JR train (Narita Line). From Tokyo to Tsuruga, it takes about three hours by Tokaido super express and express trains.
Accommodations: Please contact forum@werc.or.jp
Travel Fee Support: We will partially support travel fee in Japan for overseas participants of PTCOG XXXV meeting at Tsukuba. Please contact forum@werc.or.jp
Optional Tours: Now on planning.
More Information: Please address any inquires by e-mail to forum@werc.or.jp and visit our forum's home page URL:http://www.werc.or.jp .

Secretariat: Hiroyuki KATO, The Wakasa Wan Energy Research Center,
64-52-1 Nagatani, Tsuruga, Fukui, 914-0192, JAPAN
Tel: +81-770-24-2300 Fax: +81-770-24-2303
E-mail: forum@werc.or.jp URL: http://www.werc.or.jp

Invitation to Hyogo Satellite Meeting
Saturday 17 November 2001
Hyogo Ion Beam Medical Center (HIBMC)

Hyogo Satellite Meeting is organized in conjunction with the PTCOG XXXV, which will be held in the period 14-16 November 2001 and hosted by the Proton Medical Research Center (PMRC), University of Tsukuba, Japan. The satellite meting will be held on the weekend just after the Tsukuba PTCOG meeting at HIBMC.

We call for all the PTCOG participants to join our meeting. We will invite some of the PTCOG participants to present their talks in the meeting. We will present our status reports on accelerator, irradiation system, therapy treatment planning and preliminary results of the Clinical trials. A site tour is also included. We intend to prepare a microbus service to pick you up at the AIOI station (Shin-kansen and JR) on the day of the meeting.
Further details are given on the web page: www.hibmc.shingu.hyogo.jp/ENGLISH/HIBMC_home.html.

Contact person: Akifumi Itano Ph. D. (Acclerator Physicist)
Tel: +81 (0)791 58 0100 Fax: +81 (0)791 58 2600
Email: a.itano@hibmc.shingu.hyogo.jp

PTCOG Information/News/Reports:

The following reports and articles were received by July 2001.

News on the status of the **CATANA Project at INFN-LNS (Italy)**:

Laboratori Nazionali del Sud (INFN), Via S. Sofia 44, 95123 Catania Italy and Dipartimento di Fisica Universita di Catania, Corso Italia 57, 95100 Catania Italy

This is a progress report of ongoing of **CATANA project** at the Istituto Nazionale di Fisica Nucleare-Laboratori Nazionali del Sud (INFN-LNS) in Catania (Italy), developing a new proton therapy facility for the treatment of ocular lesions with 62 MeV proton beams from a Superconducting Cyclotron. The proton beam line is ready with all its main components including the chair for the patient positioning (Figure 1).

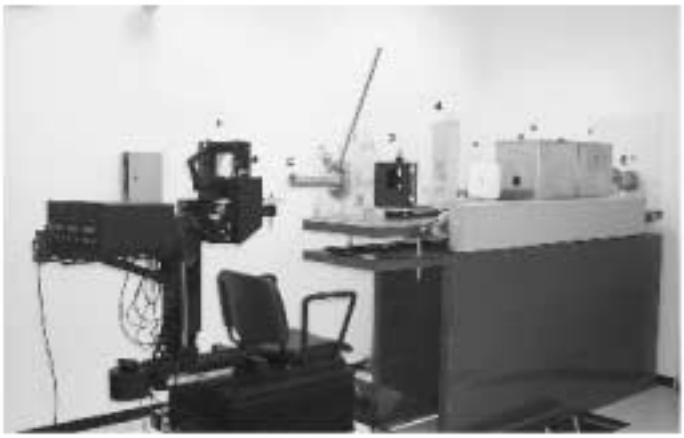

Figure 1: View of the CATANA beam line:
1.Treatment chair of patient immobilization;
2. Final collimator;
3. Positioning laser,
4. Light field simulator;
5. Intermediate collimator;
6-7. Boxes for the location of modulator wheel and range shifter;
8. Proton beam output window.

The proton beam exits in air through 50 μm Kapton window placed at about 3 meters from isocenter. Before the window, under vacuum, is placed the first scattering foil made by a 15 μm tantalum. The first element of the beam in air is a second tantalum foil 25 μm thick provided with a central brass stopper of 4 mm in diameter (Figure 2). The double foils scattering system is optimized to obtain a good homogeneity in terms of lateral dose distribution (25 mm is our goal), minimizing the energy loss.

Range shifter and *range modulator* are placed downstream the scattering system and mounted on two different boxes. Two diode lasers, placed orthogonally, provide a system for the isocenter identification and for patient centering during treatment. The emission light of a third laser is spread out to obtain the *simulation field*.

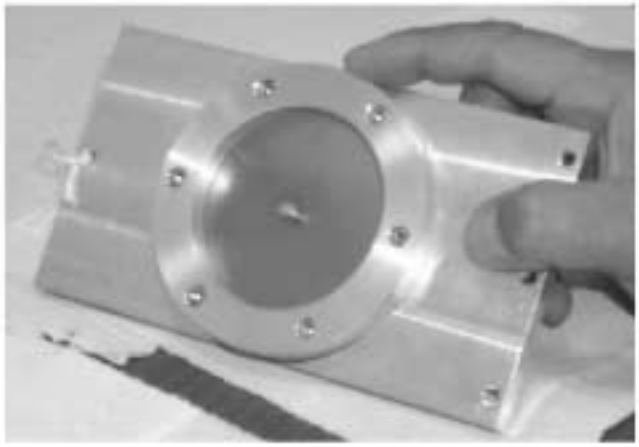

Figure 2: the second tantalum scattering foil with the central stopper.

A key element of the treatment line is represented by the two *transmission monitor chambers* (Figure 3) and by the *four sector chamber*, implemented to have an on-line control of the dose furnished to the patients and an information on beam symmetry respectively.

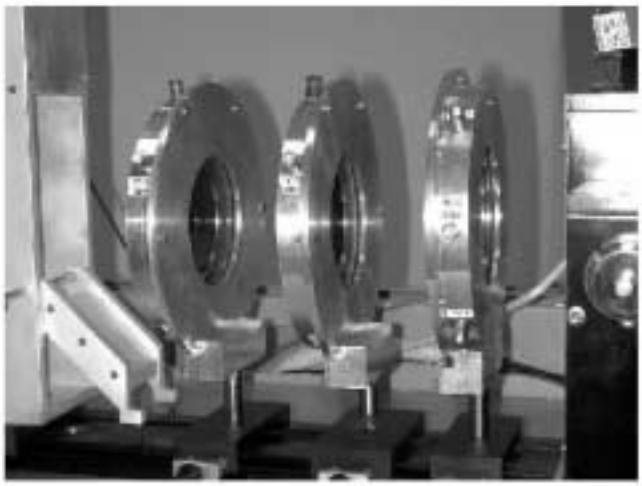

Figure 3: A view of the two monitor chambers and four sectors chamber on the CATANA line.

The last element before isocenter is a patient collimator located at 8 cm upstream of the isocenter. Finally two back and lateral Philips *Practics* X-rays tubes are mounted for the verification of the treatment fields.

Inside CATANA collaboration particular care is going to be devoted to the development of dosimetric techniques for the determination of absorbed dose in clinical proton beams and 2D and 3D dose distribution reconstruction. A parallel-plate calibrated *Markus ionization chamber* has been chosen as reference detector for the absolute dose measurement while *gaf chromic* and *radiografic* films, TLD (ThermoLuminescent Detectors), natural diamond, and silicon detectors are the choices for the relative one.

Depth dose curves and transverse dose distributions, either for the full energy and modulated proton beams, are acquired with a water-tank system provided of three fully computer-controlled step motors. This system, entirely developed at Laboratori Nazionali del Sud, is controlled by software providing the acquisition and dosimetric analysis of data. At the moment the dosimetric characterization of the proton beam is in progress to test its effective depth dose distribution, flatness, symmetry and penumbra. Figure

4 shows a depth dose distribution peak in water obtained with the water-tank system and Markus chamber for an unmodulated 25 mm diameter beam at the energy of 62 MeV.

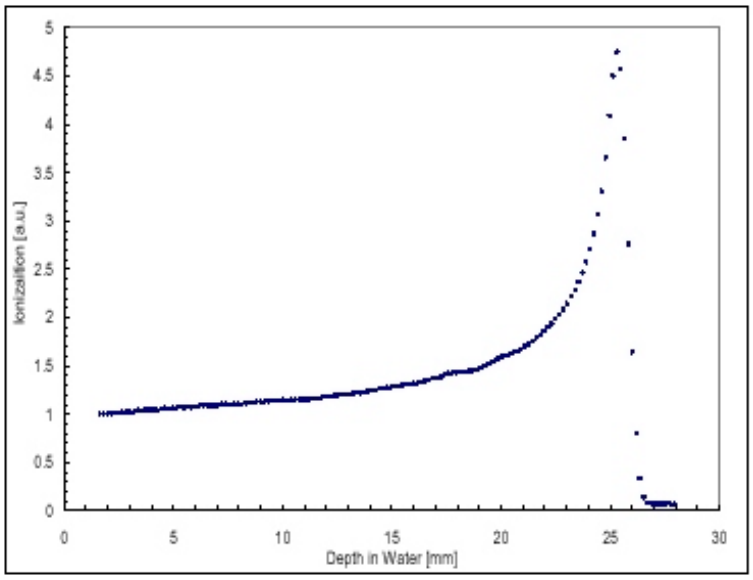

Figure 4: Depth dose distribution in water for an unmodulated 25 mm diameter 62 MeV beam.

The Full Width at Half Maximum of the Bragg Peak is 2.76 mm while the 90 – 10% and 80 – 20 % distal fall offs are 0.8 and 0.6 mm respectively. The entrance to peak ratio is 4.72. In the next month the unmodulated proton beam dosimetry will be carried out and the modulator-wheels library, made of perspex, will be verified. *G. Cuttone, INFN-LNS, V. S. Sofia 44/a, Catania, Italy.*

TREATMENT PLANNING SYSTEMS FOR PROTON THERAPY
July 2001

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	**Distributor MGH**
1980	MGH	EYEPLAN	**Distributor MGH – EYES only**
1990-96	MGH/Seimens	V-Treat(AXIOM)	Not Available
198?,1991	PSI	PSI system/Pion	**Distributor PSI**
1995	DKFZ/Royal Marsden	Voxelplan/Proxelplan	**Adapted by GSI, NAC, DKFZ**
1996	Radionics/MGH/HCL	P-Knife	Not Available
1997	LLUMC/PerMedics	OptiRad 3D	**FDA approved; commercial**
1998	Tsukuba	Hitachi system	In-house system
1998	DKFZ	OCTOPUS	**Under development – EYES only**
1994	Orsay/Curie	ISIS	Distribution ?
1998	CMS/MGH	FOCUS	**Commercial Release 1999**
1998	DKFZ	KonRad Plus Protons	Research Only
199?	Uppsala/KVI	Helax (+ protons)	Distribution ?
1989 – 2000	CCO, Clatterbridge, UK	EYEPLAN v1.6 (VMS)	Available free;eyes only; research only
	RenderPlan		?
	Adac		?
	Michigan		?
	Varian		?

Proposed NEW FACILITIES for PROTON & ION BEAM THERAPY July 2001

INSTITUTION	PLACE	TYPE	1ST RX?	COMMENTS
INFN-LNS, Catania	Italy	p	2001	70 MeV; 1 room, fixed horiz. beam
NPTC, MGH	MA USA	p	2001	230 MeV cyclotron; 2 gantries + 2 horiz
NAC, Faure	South Africa	p	2001	new treatment room with beam line 30° off vertical.
Tsukuba	Japan	p	2001	270 MeV;2 gantries;2 fixed; construction complete
Wakasa Bay	Japan		2002	multipurpose accelerator; building completed mid 1998
Bratislava	Slovakia	p, ion	2003	72 MeV cyclotron; p; ions; +BNCT, isot prod.
IMP, Lanzhou	PR China	C-Ar ion	2003	C-ion from 100MeV/u at HIRFL expand to 900 MeV/u at CSR;clin. treat;biol. research;no gantry;shifted patients
Shizuoka Cancer Center	Japan		2003	synchrotron 230? MeV; 2 gantries; 1 horiz; funded.
Rinecker, Munich	Germany	p	2003	4 gantries, 1 fixed beam, 230 MeV, scanning beams.
CGMH, Northern Taiwan	Taiwan	p	2001?	250MeV synchrotron/230MeV cyclotron;3 gantry,1 fixed
Erlangen	Germany	p	2002?	4 treatment rooms, some with gantries.
CNAO, Milan & Pavia	Italy	p, ion	2004?	synchrotron; 2 gantry;1 fixed beam rooms;1 exp. room
M. D. Anderson Cancer Center	TX, USA	p	2004?	235MeV cyclotron; 3 gantries; 1 fix + 1 exp beam rooms
Heidelberg	Germany	p, ion	2005?	
AUSTRON	Austria	p, ion	?	2p gantry;1 ion gantry;1 fixed p;1 fixed ion;1 exp room
Beijing	China	p	?	250 MeV synchrotron.
Central Italy	Italy	p	?	cyclotron; 1 gantry; 1 fixed
Clatterbridge	England	p	?	230 MeV cyclotron; part of the CASIM project
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
PTCA, IBA	USA	p	?	Several systems throughout the USA

WORLD WIDE CHARGED PARTICLE PATIENT TOTALS

July 2001

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		8906	July-01
Dubna	Russia	p	1967	— 1974	84	
Moscow	Russia	p	1969		3414	June-01
Los Alamos	NM. USA	π^-	1974	— 1982	230	
St. Petersburg	Russia	p	1975		1029	June-98
Berkeley	CA. USA	ion	1975	— 1992	433	June-91
Chiba	Japan	p	1979		133	Apr-00
TRIUMF	Canada	π^-	1979	— 1994	367	Dec-93
PSI (SIN)	Switzerland	π^-	1980	— 1993	503	
PMRC, Tsukuba	Japan	p	1983		700	July-00
PSI (72 MeV)	Switzerland	p	1984		3360	July-00
Dubna	Russia	p	1987		88	May-01
Uppsala	Sweden	p	1989		236	June-00
Clatterbridge	England	p	1989		1033	Dec-00
Loma Linda	CA. USA	p	1990		6174	June-01
Louvain-la-Neuve	Belgium	p	1991	– 1993	21	
Nice	France	p	1991		1590	June-00
Orsay	France	p	1991		1894	Jan-01
N.A.C.	South Africa	p	1993		398	June-01
MPRI	IN USA	p	1993		34	Dec-99
UCSF - CNL	CA USA	p	1994		284	June-00
HIMAC, Chiba	Japan	ion	1994		917	June-01
TRIUMF	Canada	p	1995		57	June-00
PSI (200 MeV)	Switzerland	p	1996		72	Dec-00
G.S.I Darmstadt	Germany	ion	1997		84	June-01
Berlin	Germany	p	1998		166	Dec-00
NCC, Kashiwa	Japan	p	1998		75	May-01
HARIMAC, Hyogo	Japan	p, (ion)	2001		1	June-01
					1100	pions
					3488	ions
					29852	protons
				TOTAL	34440	all particles

The Proposed Facilities List is on the previous page.