SUMMARY OF SESSION 4

[Novel Technologies in Radiation Therapy]

OF THE WORKSHOP

PHYSICS FOR HEALTH IN EUROPE

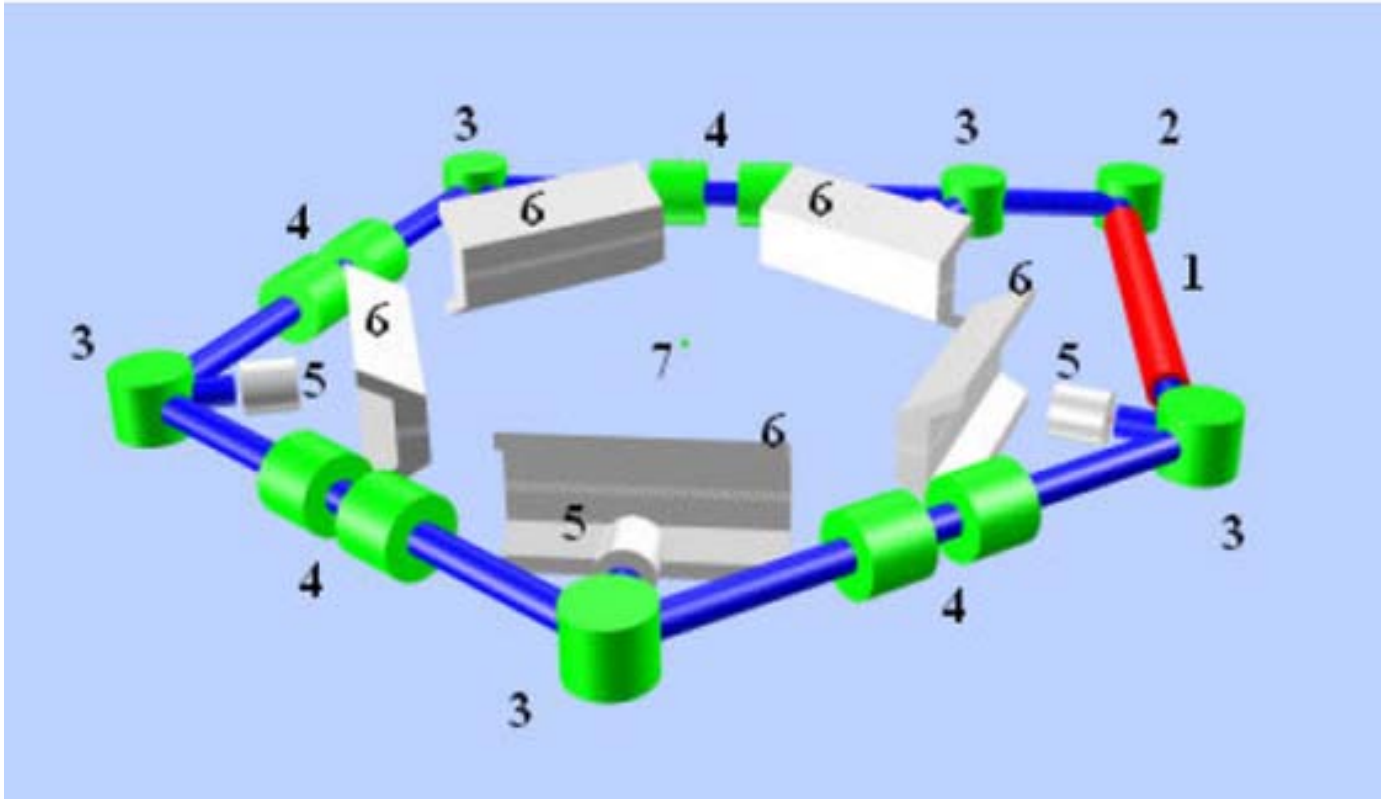
Purificacion Tejedor Del-Real
(European Commission)

Ken Peach
(Oxford)

CONVENTIONAL RADIOTHERYPY

N. Achterberg (Erlangen)

The TOM'5 system for multibeam tomotherapy



ACCELERATORS AND GANTRIES FOR HADRONTHERAPY

Concentrate on

A.Unconventional accelerators for protons

B.Novel proposals for carbon ions accelerators

C.Innovative components for accelerators

D.Gantries for carbon ions

Note: The treatment of moving organs has been discussed by S. Zenklusen (Gantry 2 for protons at PSI) and Ch. Bert (carbon ions at GSI)

Europe is at the frontier

Protons

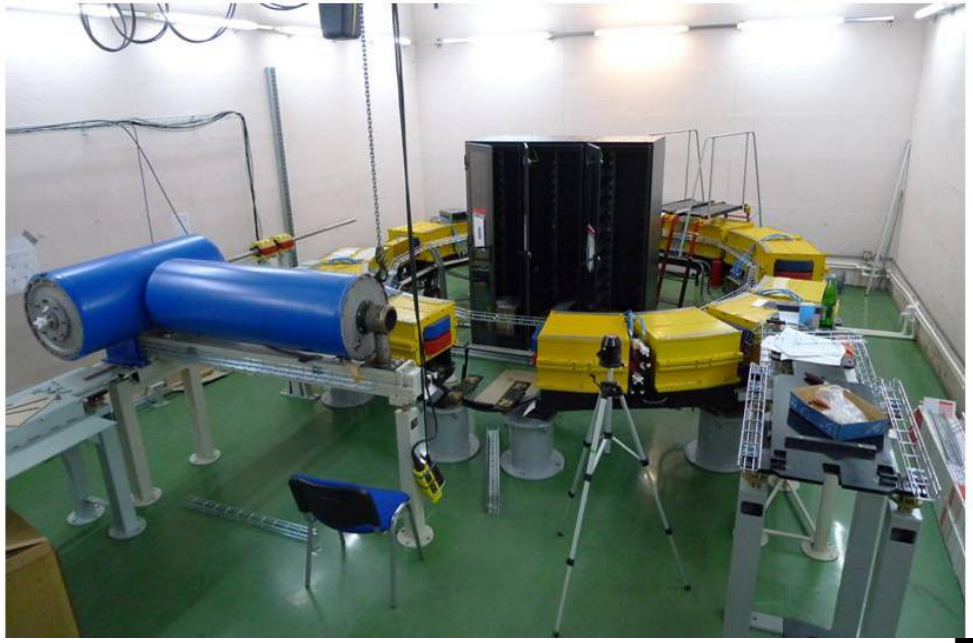
Talks of Ken Peach and Jean-Pierre Gérard

New equipment and new technology for the mass treatment of the oncological diseases by proton beams
Abstract ID: 112
V. Balakin, PROTOM

Progress and perspective of INR radiological center in Troitsk (protons, X rays, brachitherapy, Neutron Capture Therapy)
Abstract ID: 100
Sergey Akulinichev, Institute for Nuclear Research

Facility for hadron radiotherapy of the Joint Institute for Nuclear Research (protons at the Phasatron)
Abstract ID:21
Dr. Mytsin, JINR

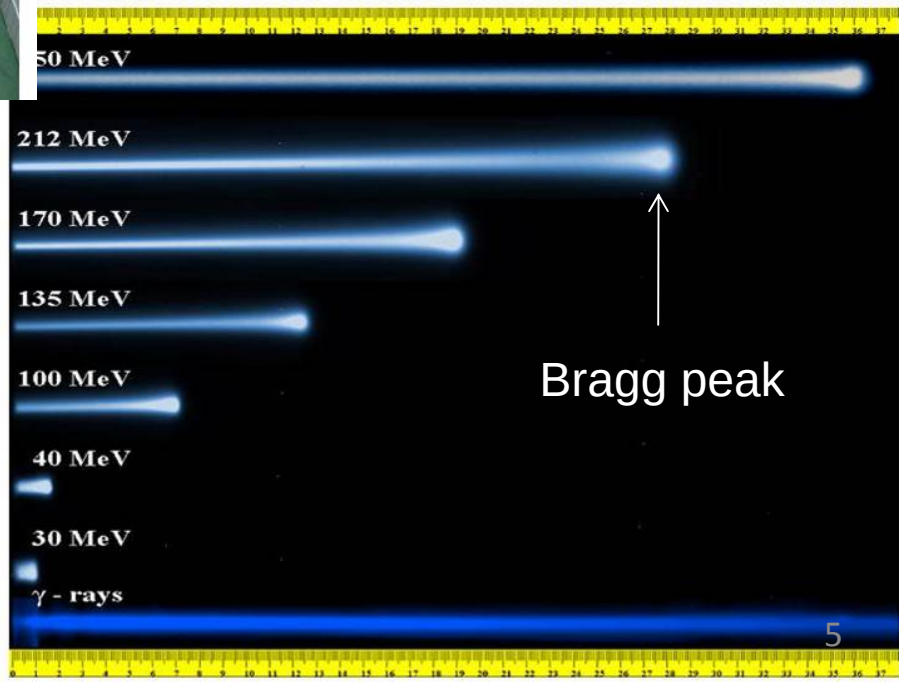
Protons



5 meter diameter Synchrotron

Commercialized
by the Company PROTOM
In collaboration with MIT/Bates

Protons have been accelerated



Carbon ions

MedAustron – Austrian Hadron Therapy Centre
Abstract ID: 130
Adrian Fabich, EGB MedAustron

Superconducting Magnet Technologies as basis for Design of Medical Carbon and Proton Synchrotron at Dubna
Abstract ID: 61
Alexander Kovalenko, JINR

A cyclotron-linac complex for carbon ion therapy
Abstract ID: 65
A Degiovanni, TERA Foundation

New projects of cyclotrons C235 and C400 for proton and ion therapy
Abstract ID: 98
E. Syresin, JINR

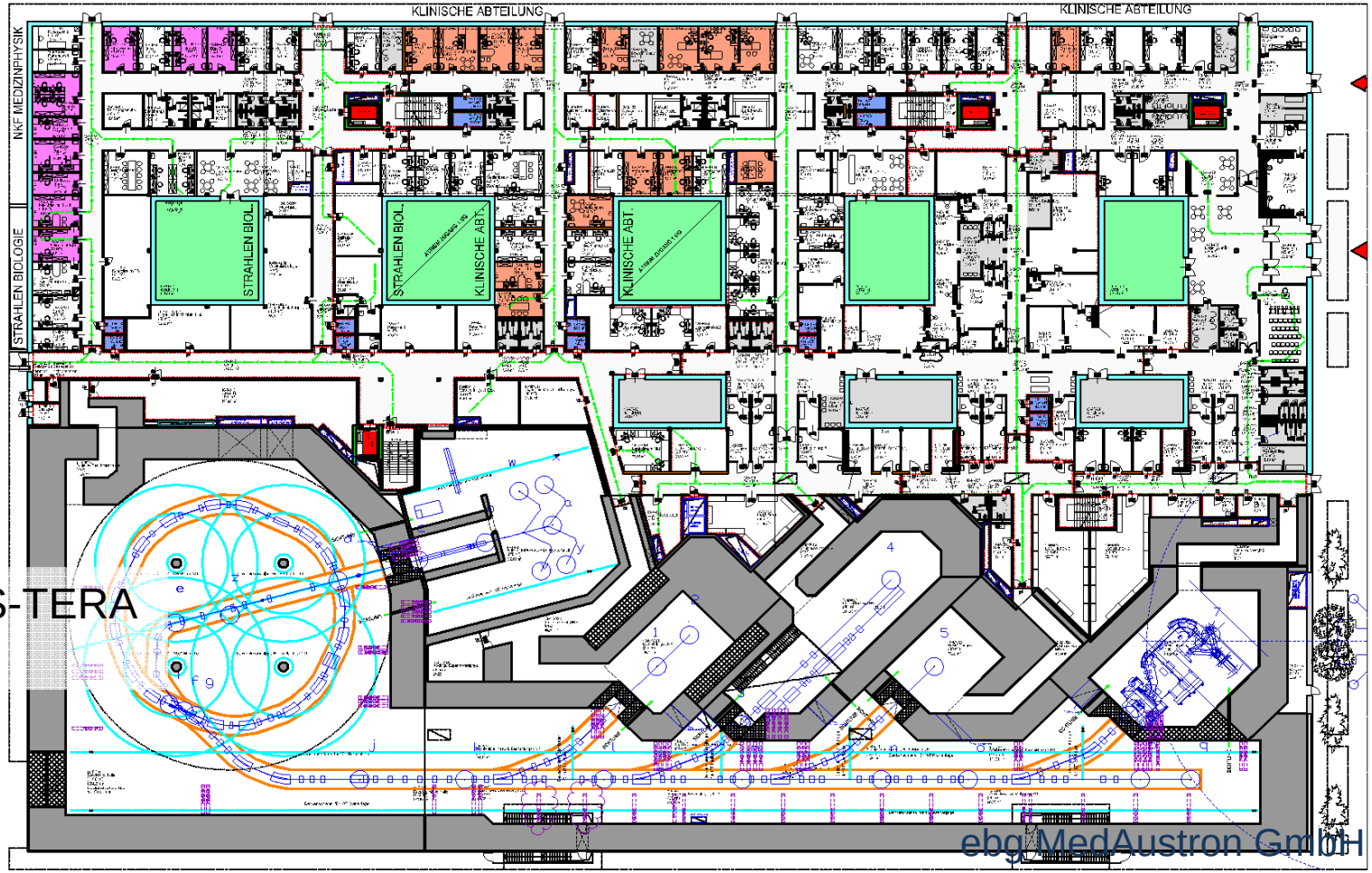
Carbon ions

MedAustron – Austrian Hadron Therapy Centre

Abstract ID: 130

Adrian Fabich, EGB MedAustron

PIMMS-TERA Design

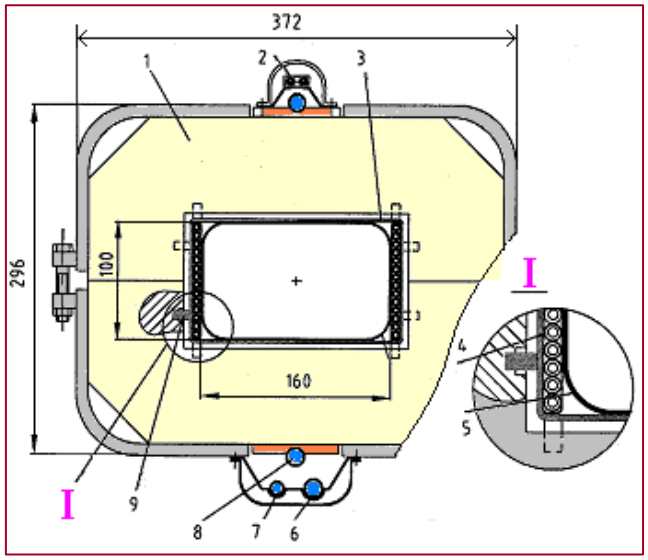


Carbon ions

<u>Superconducting Magnet Technologies</u> as basis for Design of Medical Carbon and Proton Synchrotron at Dubna

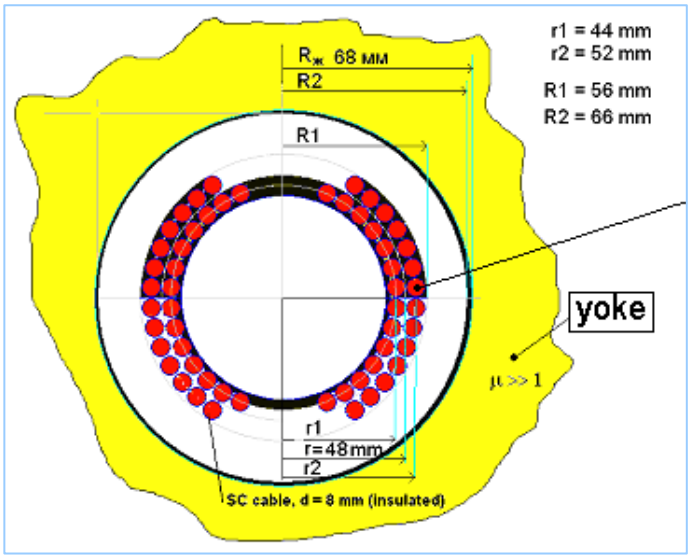
Abstract ID: 61

Alexander Kovalenko, JINR



1.8T solution

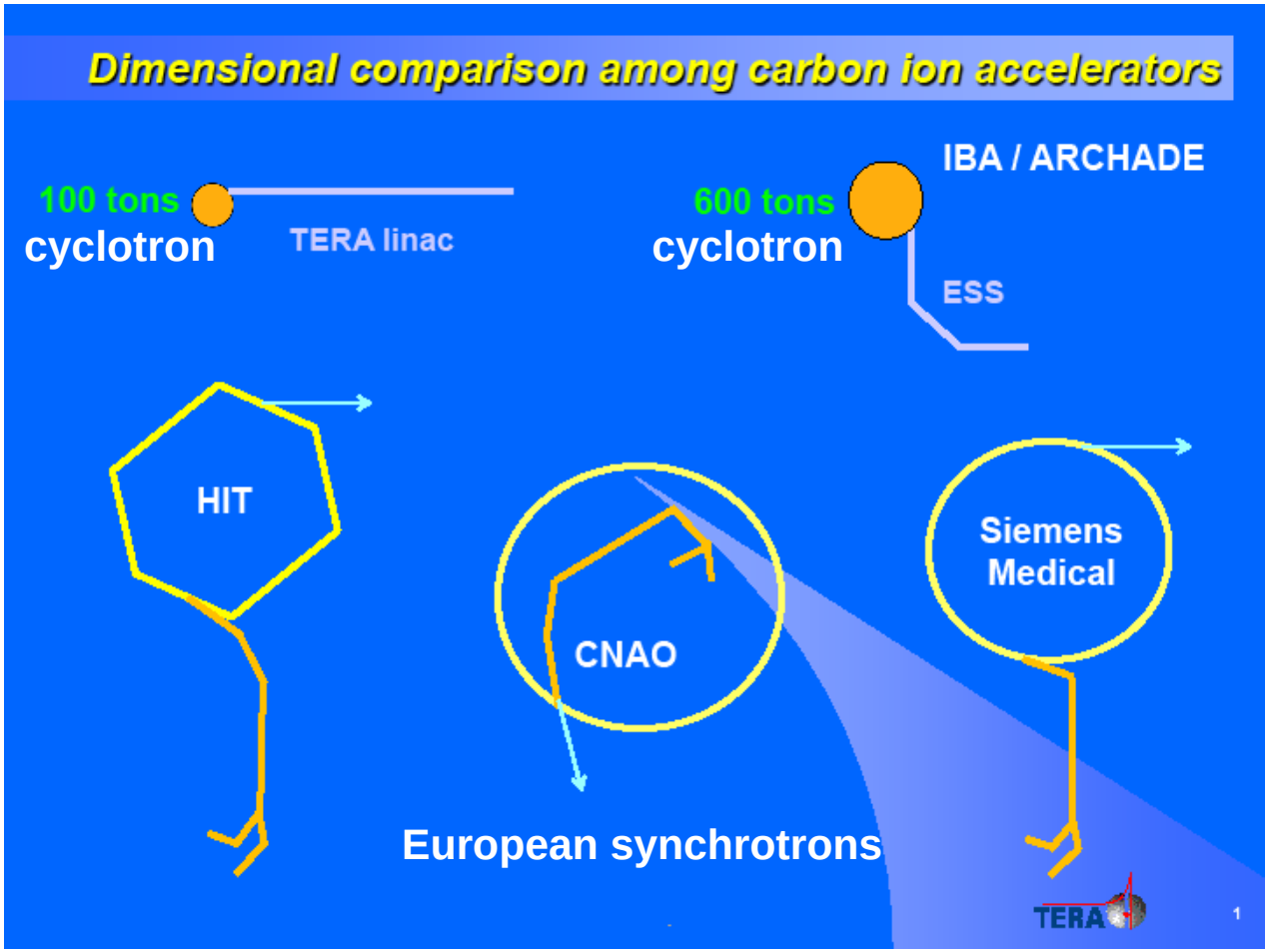
Similar to the Nuclotron



4T solution

Carbon ions

A cyclotron-linac complex for carbon ion therapy
(high gradient "cyclinac" at 6 GHz**)**
Abstract ID: 65
A Degiovanni, TERA Foundation



Accelerator components

Formation of primary radioactive carbon ion (C-11) beams applied for cancer treatment and PET (for the HIMAC synchrotron, Japan)
Abstract ID: 99
E.Syresin, JINR

Low Power
Electron Beam Ion Source

JINR Electron string source-KRION-2

R&D of ion sources and cyclotrons for hadron therapy facilities
Abstract ID: 49
S. Gammino, INFN-LNS

Special Magnets for medical accelerators
Abstract ID: 138
J. Borburgh, CERN

Magnetic measurements for medical accelerators
Abstract ID: 27
M. Buzio, CERN

Gantries

Gantry Work Package of PARTNER and ULICE projects
Abstract ID: 104
M. M. Necchi, CNAO Foundation- Pavia

A Gantry-less delivery of radiation therapy (vertical position as in ProTom scheme – vertical CT and MR scanner)
Abstract ID: 104
D. Dimitroyannis, Kansas City Center

Gantry 2 - the next generation of a proton scanning gantry at PSI (discussed by S. Zenklusen)

Abstract ID: 81 20
David Meer, Paul Scherrer Institute

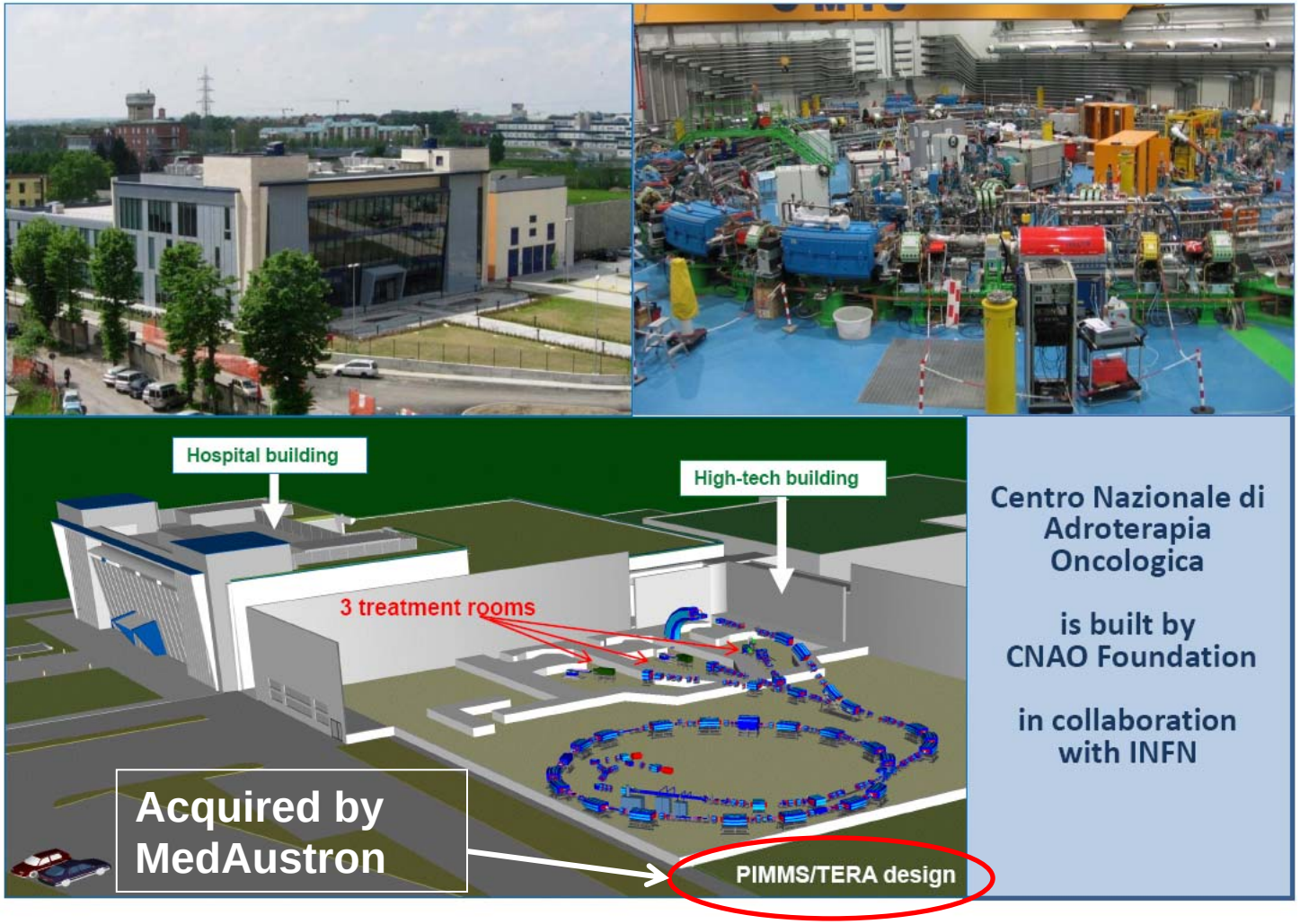
ULICE

Gantry Work Package of PARTNER and ULICE projects

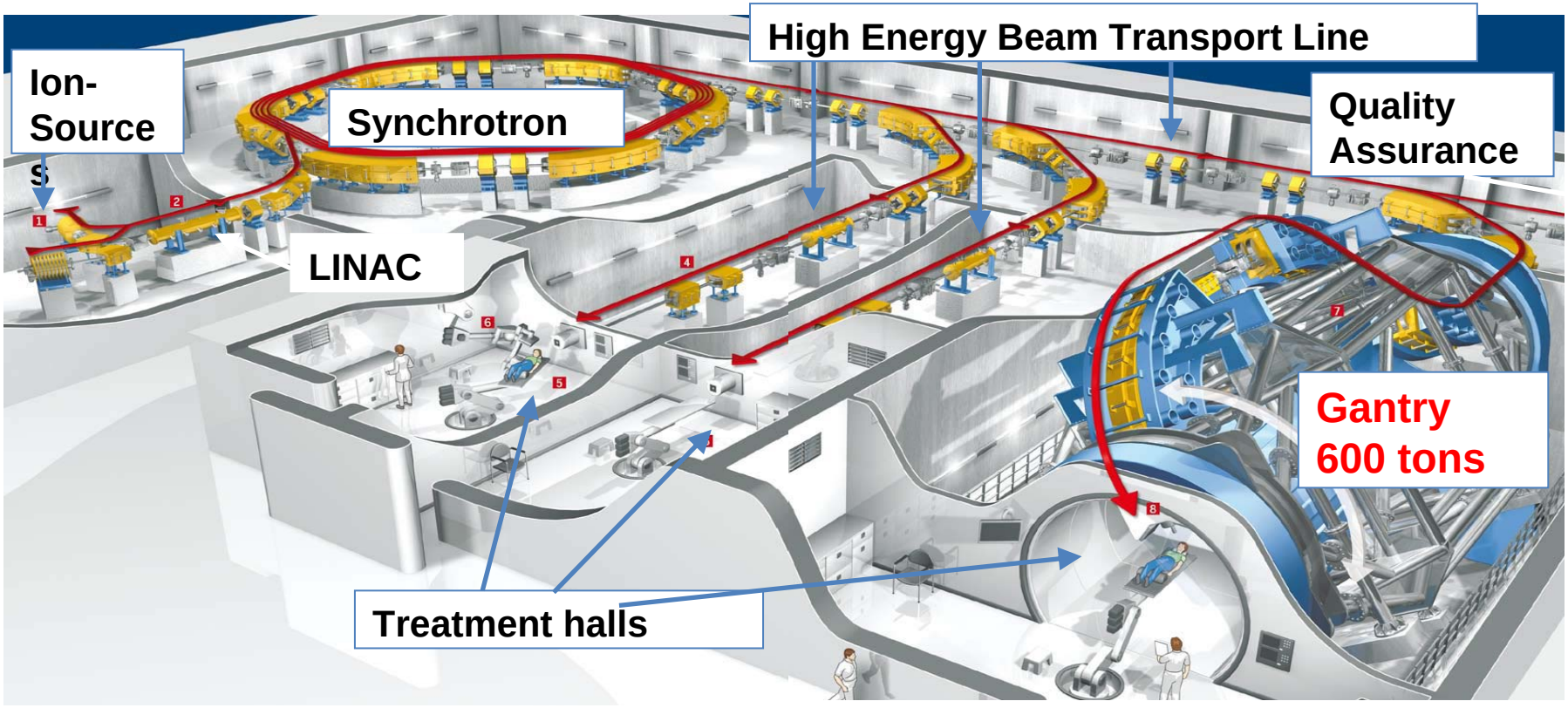
Coordinaors: Manjit Dosanjh, CERN Roberto Orecchia, CNAO

Abstract ID: 104

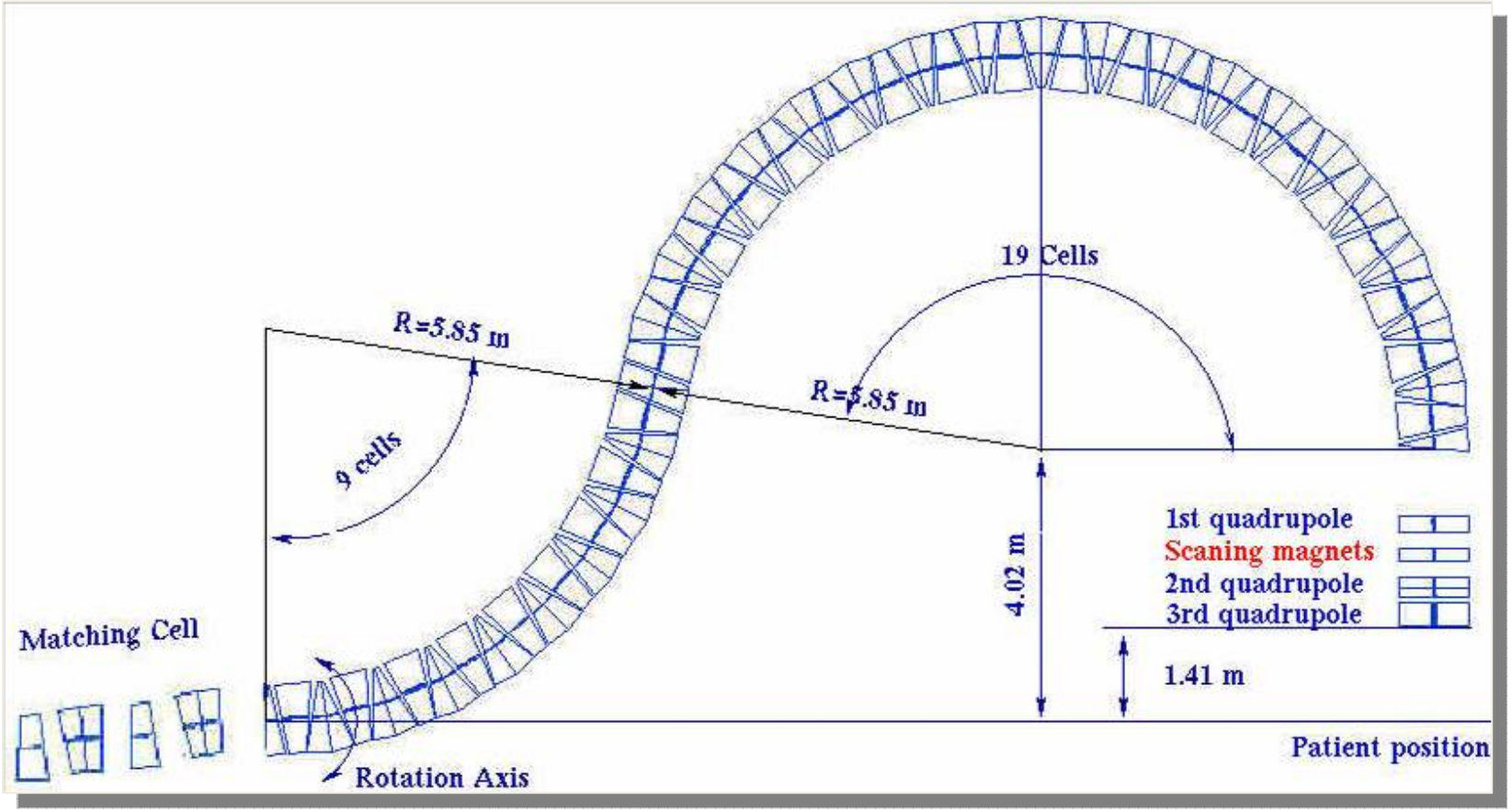
M. M. Necchi, CNAO Foundation- Pavia



HIT, Heidelberg
The only existing carbon ion gantry

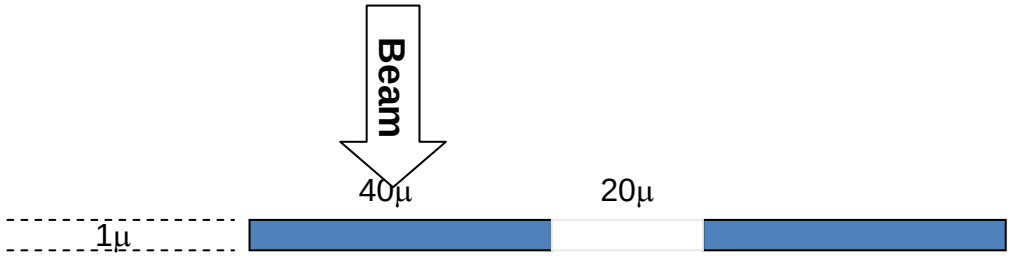


ULICE Work Package Leader: Marco Pullia
The group will look also at the FFAG gantry (D Trbojevic/BNL)



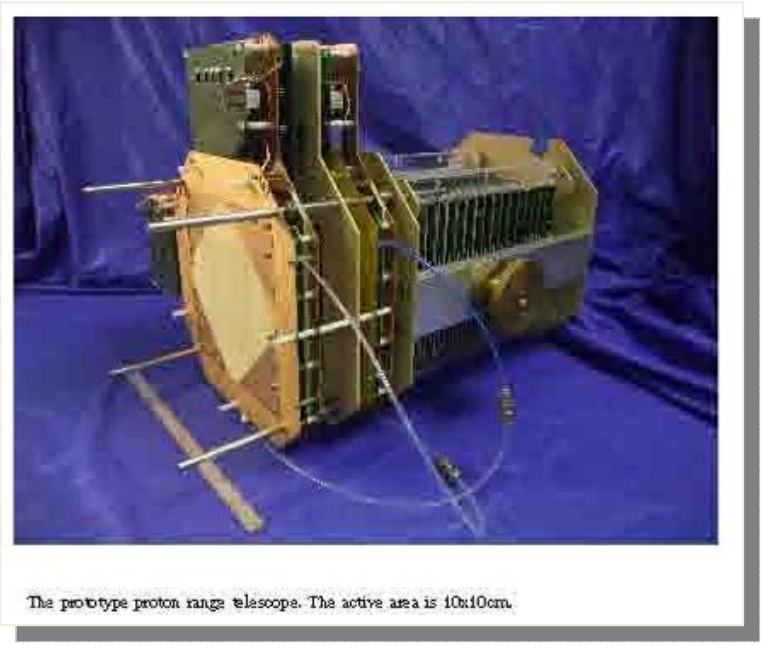
DETECTORS
Selected new topics

Metal microdetectors for measuring and imaging beams of particles
Abstract ID: 17
Valery Pugatch, Institute for Nuclear Research



Thin (1micron) metal strips
spacing 40 microns (1000 strips)

A Proton Range Telescope for Quality Assurance in Hadrontherapy
Abstract ID: 37
David Watts, TERA Foundation
30 x 3mm scintillator telescope
for QA and proton radiography


The prototype proton range telescope. The active area is 10x10cm.

Ion therapy dosimetry by fiber-coupled thin-film-luminescence detectors
Abstract ID: 70
Felix Klein, German Cancer Research Center

Design and performance of an ionization chamber monitor for IBA proton treatment lines
Abstract ID: 109
M. Labalme, LPC - Caen

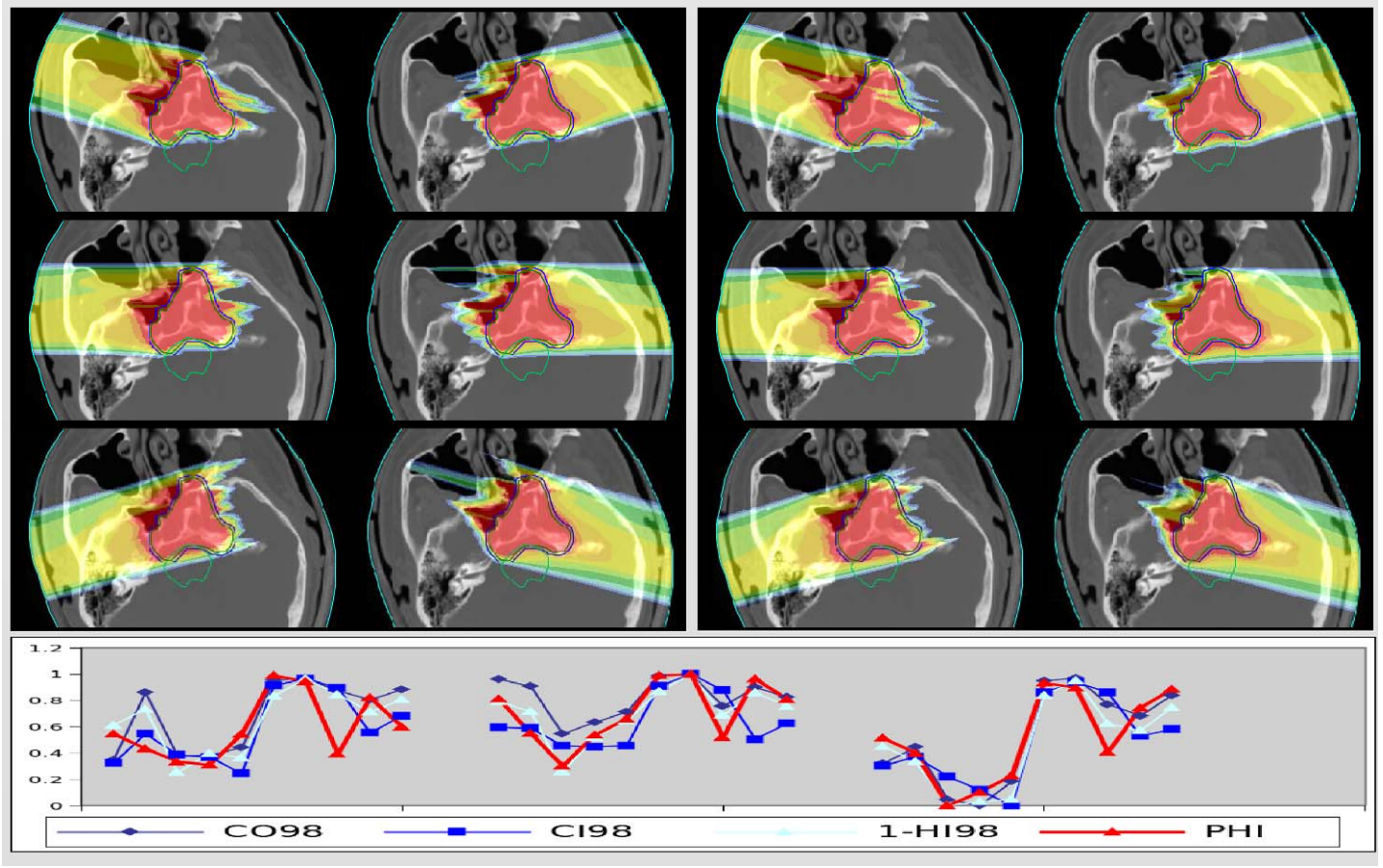
SOFTWARE DEVELOPMENTS
Selected topics

The Port Homogeneity index for the selection of optimal beam configuration in ion therapy

Abstract ID: 122

F. Ammazzalorso, University Hospital of Giessen

Winning Poster



SOFTWARE DEVELOPMENTS
Selected topics

Beam Angle Optimisation in Particle Therapy
Abstract ID: 71
Stefan Speer, Strahlenklinik Erlangen

Simulating the beam polarization for Microbeam Radiation Therapy using Geant4 toolkit
Abstract ID: 141
J. Spiga, INFN and Cagliari University

FINAL TOPIC:
A proposal for CERN involvement

Conclusion of the presentation:

Opportunities for CERN to support a European initiative in technology transfer & to provide a general facility for research and development in the bio-medical domain

Interested parties should contact to the proponents

If enough interest, a Consortium will be set-up

Summary

Novel Technologies in Radiation Therapy:

Thanks to all speakers and to those who presented posters.

Many interesting ideas.

Much has already been achieved …

but there is much more still to do …