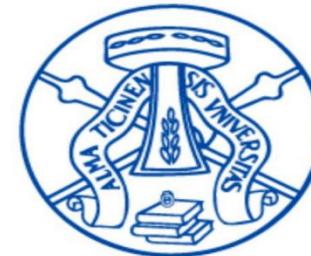




UNIVERSITÀ
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C I C O P S

Centre For International Cooperation
& Development

Dosimetry challenges in adjacent field matching for scanning particle beams

(Supervisors)

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&

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King George's Medical University, Lucknow

About my country: India

- In South Asia
- Seventh largest country by area
- Population-1.3 billion
- 29 states & 7 union territories
- Capital – New Delhi
- Largest City - Mumbai



Uttar Pradesh: A state in India

- Total Area - 93,935 square miles
- India's fourth-largest state in terms of land area.
- Created on 1 April 1937
- Renamed Uttar Pradesh in 1950
- 18 divisions and 75 districts
- Capital- Lucknow.

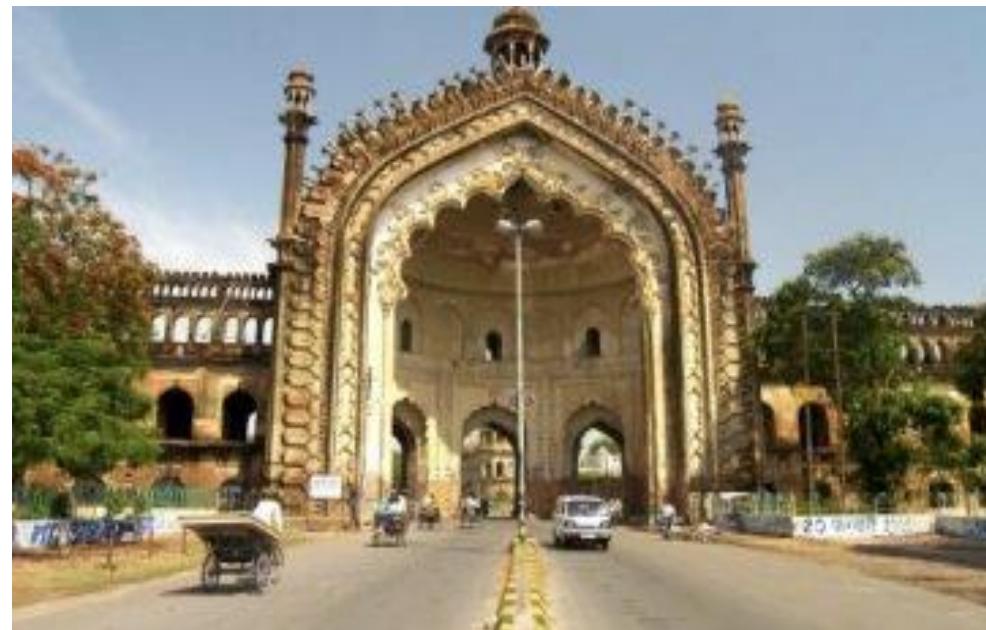


Famous cities across U.P.

- Varanasi: Spiritual capital of India
- Agra
- Lucknow: The City of Nawabs
- Prayag Raj
- Ayodhya
- Mathura
- Kanpur



Lucknow



Lucknow...

- Lucknow covers an area of 976 square Miles
- Historically, Lucknow was the capital of the Awadh region
- The Capital of Uttar Pradesh.
- Total university – 10
- Medical Institute – 4
- Research Institutes – 7
- Super Speciality Cancer Institute



King George's Medical University, Lucknow

- Foundation stone-1906
- The college opened its gates in 1911
- Capacity:
 - 1250 undergraduates students
 - 450 postgraduate students



Faculties and institutes

- Faculty of Medical Sciences
- Faculty of Dental Sciences
- Institute of Paramedical Sciences
- Institute of Nursing
- Total Departments- 75

Department of Radiation Oncology

- Parent department established in 1927
- Radiation Oncology department created in 1986
- Total Faculties – 10
 - a) Radiation Oncologist- 6
 - b) Medical Physicist- 4

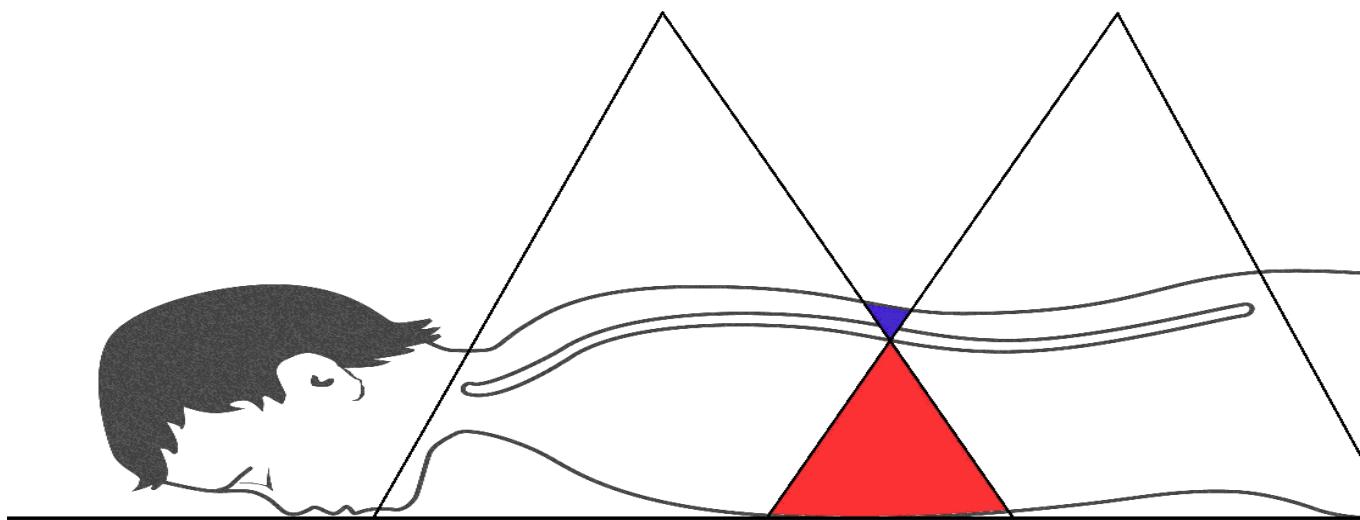
Department of Radiation Oncology....

- Total seat for MD students- 6
- Senior Residents- 3
- Clinical services provided:
 - a. Radiotherapy (including External Beam Radiotherapy and Brachytherapy)
 - b. Chemotherapy
- Annual OPD attendance of New Patients ≈4500

Photon Therapy

- CSI is often used for the treatment of medulloblastoma
- Photon beam penumbra \approx 7–8 mm
- Photons exhibit a significant dose tail extending several centimeters beyond the 10% dose
- Non uniform dose is achieved at the junction of two adjacent fields

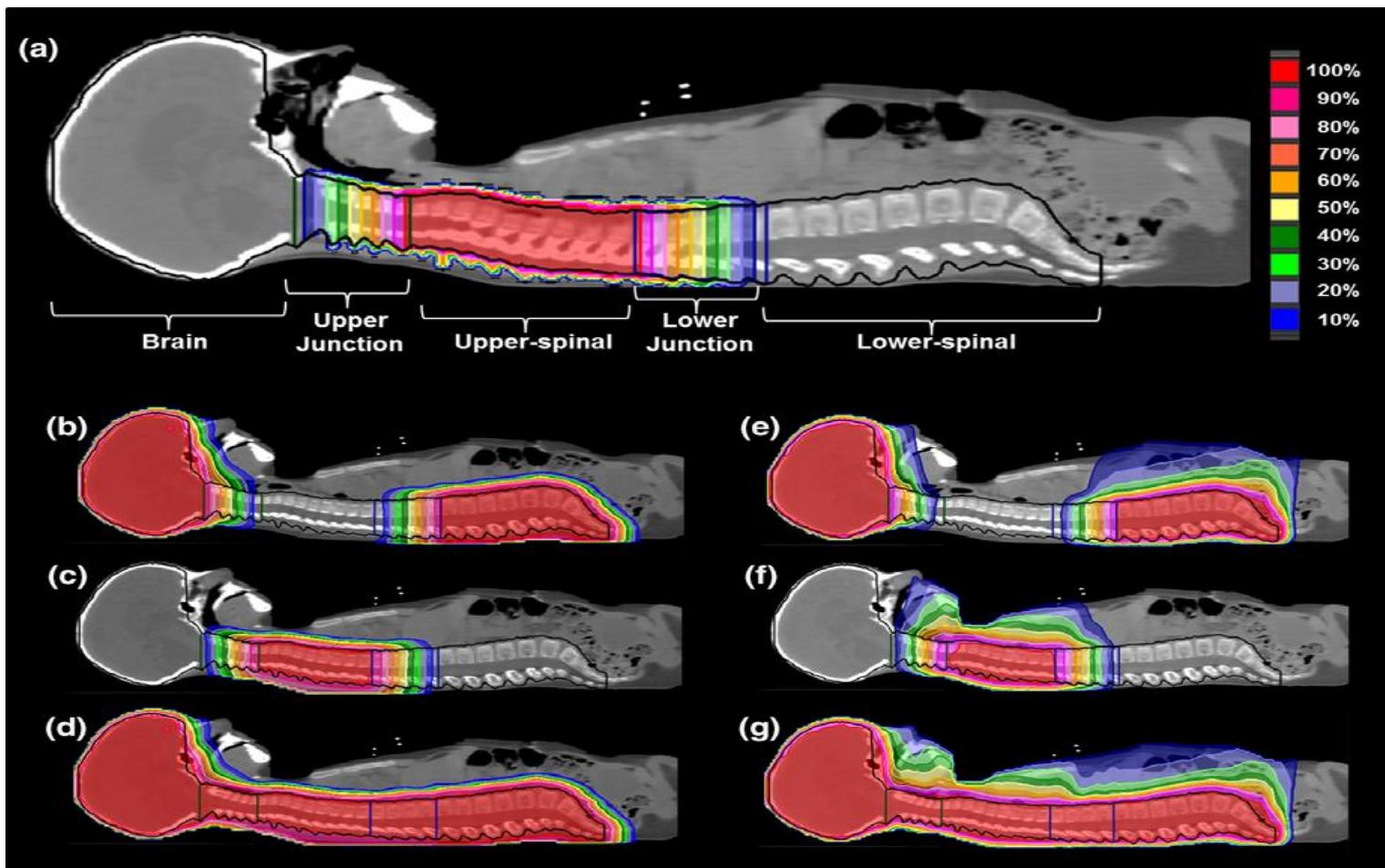
Sketch showing two adjacent fields not geometrically matched. The underdosage region (where none of the fields contribute) is highlighted in blue. The overdosage region (where both fields contribute) is painted in red



Objective

- Proposed area of research: Dosimetry challenges in adjacent field matching for scanning particle beams
- Deals with the critical issue of treatment field matching for the irradiation of large pelvic tumors, Seminoma or cranio-spinal irradiation in pediatric patients, using proton or carbon ion scanning beams.

Field junction by the background dose technique (a) with protons by pencil beam scanning (on the left, b–d) and with photons by VMAT (on the right, e–g). The target was divided into five volumes: brain, upper-junction, upper-spinal, lower junction, and lower-spinal. Dose distributions of the optimized brain and lower-spinal fields (b, e), of the optimized upper-spinal field (c, f) and total dose distributions (d, g) are shown.



Current work at CNAO, Pavia

- Perusal of research articles and scientific journals related to proposed study
- Active participation in routine Quality Assurance program of the Proton and Carbon beam
- Establishing acquaintance with treatment planning system (TPS) and treatment delivery techniques in various sites (e.g, Gated Radiotherapy)

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**Thank You Very Much
For Your Attention!!!**