Chapter 9: Medical applications of Accelerators and impact on humanity and society

- In short, what is our Chapter about?
  - Use of accelerators in medicine
  - Human centric techniques in external beam radiotherapy
  - New technology that is emerging from the convergence of technologies that have failed to make an impact
Chapter 9: Summary Status

- Our estimate of current level of completion: 90%
- The following additions/revisions will be completed by July 31st
  - Restructure the listed accelerators to reflect the therapeutic beam requirements; this requires a review of all existing text and references for coherent reading
  - Complete final sections on convergence and overall impact on society
  - Compare the content with other chapters and see if the narrative is correct.
- (if) our chapter includes direct quotes or images/figures used from other sources, permission needs to be asked from them as follows (examples!):
  - Maps of global distribution of radiological and nuclear medicine processes, extracted from the IAEA database; maps are currently produced using their engine – if necessary we can produce these maps from raw data and GIS
  - Table 1 is reproduced from the following book Chapter: Murshed et al., 2019 “Chapter 3 – Radiation Biology”, in Fundamentals of Radiation Oncology, 3rd Edition, 2019 pp 57-59, https://doi.org/10.1016/B978-0-12-814128-1.00003-9
  - Above list is non-exhaustive and more will be added (will be completed by the end June).
Chapter 9: Key messages, insights (possible input for other chapters)

- Accelerators have been used in medicine for a long time
- Technology has a long adoption curve due to high capital costs.
- Step change in impact once new technology is adopted, and then a long tail of continuous improvement
- In this area, technologies that have failed to reach clinical use, are becoming relevant to address the evolving requirements of existing and emerging sectors
- Advances in accelerator technology are making them cheaper and lowering the capital costs, making these treatment type available to greater numbers of people (democratisation of access).